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# *Manual of Conchology, Structural and Systemic; with ...*

George W. (George Washington) Tryon, Henry Augustus Pilsbry, B. Sharp, Academy of Natural ...

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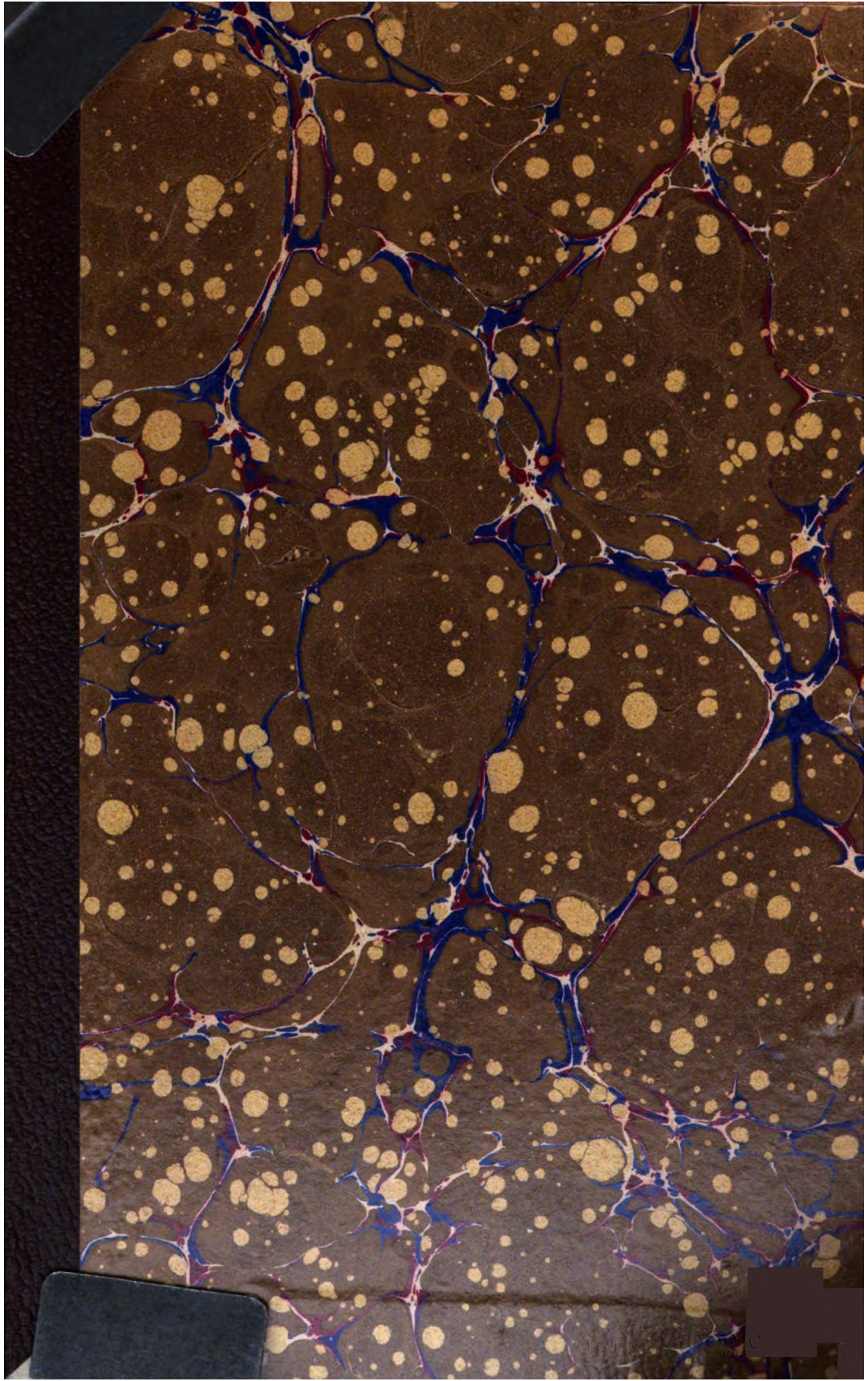

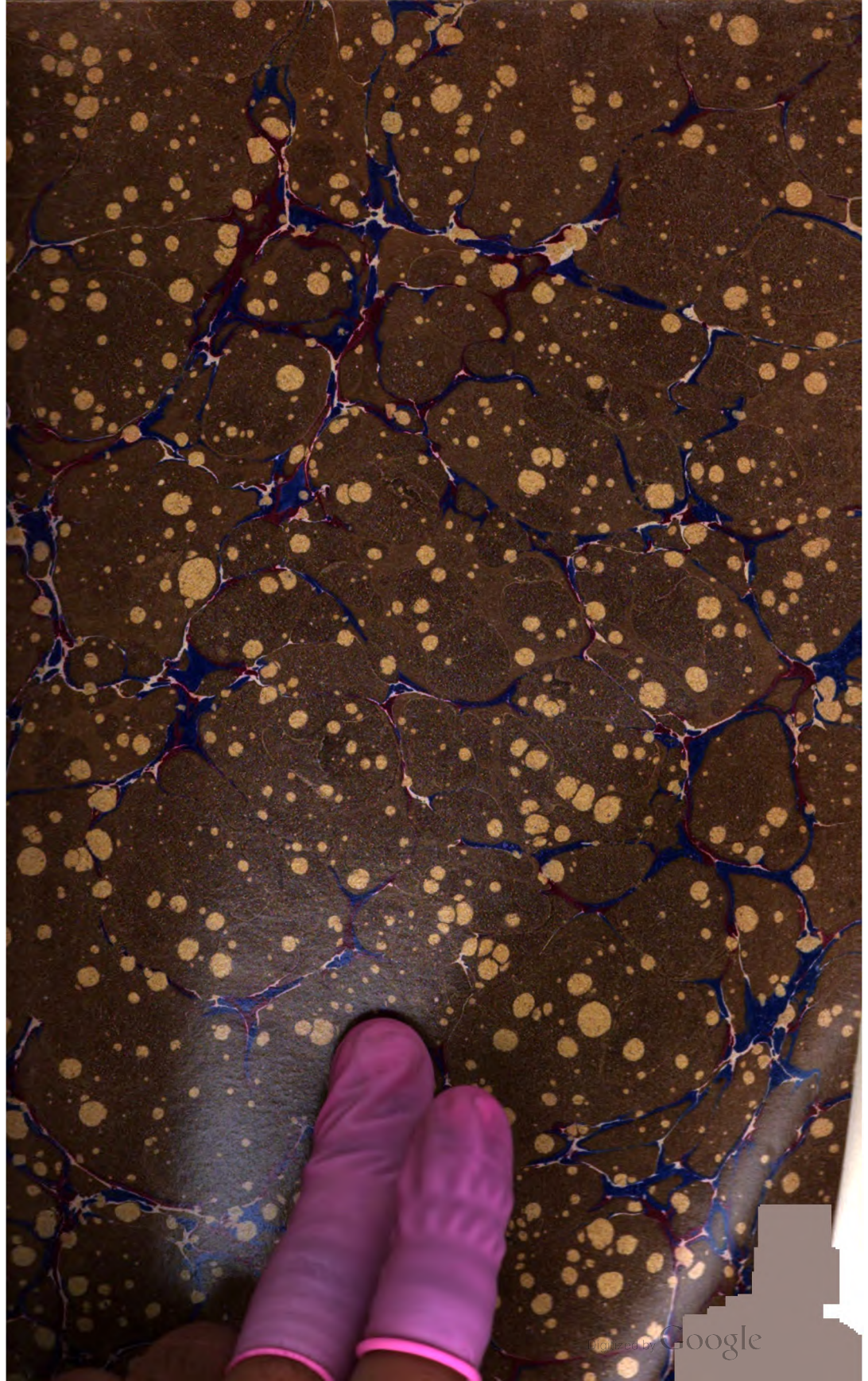
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SECOND SERIES: PULMONATA.

# MANUAL

OF

# CONCHOLOGY;

## STRUCTURAL AND SYSTEMATIC.

WITH ILLUSTRATIONS OF THE SPECIES.

BY GEORGE W. TRYON, JR.

CONSERVATOR OF THE CONCHOLOGICAL SECTION OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.

VOL. I.

TESTACELLIDÆ, OLEACINIDÆ, STREPTAXIDÆ, HELICOIDEA, VITRINIDÆ, LIMACIDÆ, ARIONIDÆ.

PHILADELPHIA:

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# PREFACE.

THE classification of the "Pulmonata" will be essentially that exhibited in the third volume of my "Structural and Systematic Conchology;" modified, nevertheless, as to minor details, and chiefly by the introduction of additional groups. In the arrangement and synonymy of the species, the late Dr. Louis Pfeiffer's "Nomenclator Heliceorum Viventium," 1878, will be my principal guide, and I will endeavor so to intercalate the more recently described species as to preserve the essential features of that monumental work. Exceptions have been taken to Dr. Pfeiffer's classification, as well as to his synonymy; but I think that the former will usually be found quite as progressive as the incompleteness of material at present accessible will warrant; whilst the latter, which is more especially in the line of the late learned doctor's life-study, ought certainly to be well digested, and worthy of confidence. I shall not follow him blindly, however. I shall consider the opinions of the special students of each local fauna as entitled to great weight, and I shall constantly subject questions of synonymy to the test of comparison of specimens in the admirable collection of terrestrial shells in the Museum of the Academy of Natural Sciences of Philadelphia.

The illustrations will usually be carefully-made copies of the typical figures, accompanied, when necessary, by others showing variations of form, sculpture and coloring. The Philadelphia Collection includes authentic types and authors' examples of numerous species heretofore unfigured: these I shall have the pleasure of including in my plates. Messrs. Edwin L. Sheppard and John Ross, whose faithful and finished drawings of the marine shells of the "Manual" have been much commended, will supply the illustrations for this series also; and the coloring will continue in the hands of the experienced lady-artists who have worked so faithfully upon the "Manual" since its beginning.

In the arrangement of the text I shall continue the style of the marine series. The figures will be relied upon to convey to the student the more obvious specific characters, and only those features which are obscure, or not likely to obtain immediate recognition by the eye, will be dwelt upon. The differential characters of nearly allied and easily confounded species will be carefully stated. The coloration will always be described, for the information of those who subscribe for copies of the work with uncolored illustrations.

GEORGE W. TRYON, JR.

ACADEMY OF NATURAL SCIENCES,
*Philadelphia, January 1, 1885.*

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# MANUAL OF CONCHOLOGY.

## PULMONATA.

The subclass Pulmonata includes all mollusks breathing air. They are normal gastropods, having a broad foot and usually, a large spiral, inoperculate shell. Although mostly terrestrial, a few aquatic and a number of fluviatile forms are here included. There are no marine species, but the Auriculidæ are in great part inhabitants of seashores where, at high-tide, they are covered by the waters. As to food, some are carnivorous, but the subclass is, as a rule, phytophagous. The teeth are numerous, similar, recurved, aculeated or dentate at the extremity, with broad pavimental bases. These teeth are developed many in a row, upon a broad lingual ribbon; when the rows are straight the teeth are similar throughout, when curved or angulated the forms of the teeth become more or less changed. There is usually a single, rather conspicuous upper jaw, composed of one or of three pieces—never of two pieces as in the branchiferous mollusks.

Sexes united in each individual, but the union of two individuals required for mutual impregnation. Genital orifices sometimes contiguous, opening in a common cloaca, sometimes distinct.

The Pulmonata are related to phytophagous sea-snails through the Cyclostomæ or operculated land-snails, and the Ampullariæ, to the limpets through Gadinia, Siphonaria, to the nudibranchs through Onchidium.

Detailed accounts of the structure, development, habits, geographical and geological distribution of the Pulmonata are given in the "Structural and Systematic Conchology," and need not be reproduced here.

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Order I. STYLOMMATOPHORA.

(Geophila, Ads. Nephropneusta, Ihering.) Eyes at the extremities of the superior tentacles.

Order II. BASOMMATOPHORA.

(Branchiopneusta, Ihering.) Eyes at the bases of the tentacles.

## ORDER STYLOMMATOPHORA.

Almost exclusively terrestrial mollusks, none fluviatile; having four tentacles, the superior pair the largest, invaginate or retractile, oculiferous at their extremities.

Suborder I. MONOTREMATA. Oculiferous tentacles invertible; male and female orifices united. Terrestrial. Shell usually present and mostly external; sometimes internal, or absent.

Suborder II. DITREMATA. Oculiferous tentacles contractile, not invertible; male and female orifices widely separated. Terrestrial or aquatic. No shell.

### SUBORDER *MONOTREMATA.*

**Agnatha.* Mouth without jaw. Carnivorous.

***Gnathophora.* Mouth with jaw. Phytophagous.

#### **Agnatha.*

Radula generally without median teeth; lips often developed into feeler-like appendages, neck commonly elongated and peculiarly furrowed on the back.

*Families.*

Testacellidæ, Oleacinidæ, Streptaxidæ, Helicoidea.

See "Structural and Systematic Conchology," iii, 11–18.

### FAMILY *TESTACELLIDÆ.*

Animal slug-like, bearing a small ear-shaped shell near the posterior extremity of the body. Lingual teeth long and narrow, sharp-pointed, in oblique series.

*Synopsis of Genera.*

Genus TESTACELLA, Cuvier, 1800.

Animal limaciform, subcylindrical, tapering anteriorly; tentacles simple, mantle small, posterior, quite near the tail, covered with a small external shell; no longitudinal furrows above the margin of the foot, and no caudal mucous pore; no distinct locomotive disk; respiratory orifice at the posterior right edge

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of the mantle under the peristome of the shell; combined generative orifice behind and below the right superior tentacle.

Shell external, rudimentary, imperforate, ear-shaped, with a subspiral, posterior nucleus.

### Genus DAUDEBARDIA, Hartmann, 1821.

Animal with longitudinal furrows above the margin of the foot, otherwise resembling Testacella. Usually no caudal mucous pore.

Shell small, external, perforate, depressed, thin and shining, transparent; paucispiral, the whorls rapidly increasing.

Section RUFINA, Clessin. Shell umbilicated.

Section PSEUDOLIBANIA, Stefani. Shell haliotiform, spire very short, narrowly rimate; columellar lip slightly reflected over the umbilical slit.

Section LIBANIA, Bourguignat. Umbilicus covered in the adult.

Section ISSELIA, Bourguignat. Shell perforated. Animal with caudal mucous pore.

### Genus CHLAMYDEPHORUS, Binney, 1879.

Mantle covering the whole body, with an orifice on the centre of the back near the tail, enclosing a solid, internal shelly plate; no caudal mucous pore; position of the genital orifice unknown.

### ? Genus PLECTROPHORUS, Férussac, 1819.

Animal elongated, subcylindrical, with a tough dorsal anterior integument or mantle, under which is the pulmonary cavity, having its orifice on the right side, with the anal orifice near it; there is a second long and narrow dorsal posterior mantle, and an external rudimentary conical, non-spiral shell near the posterior extremity; upper tentacles longest, oculiferous, retractile.

This animal, figured by Férussac and said to inhabit Teneriffe, has not been recognized by collectors; the double armor of the back and the conical shell are both improbable-looking characters.

### Genus SELENOCHLAMYS, Böttger, 1883.

Animal resembling Daudebardia, but without a shell; mantle small, the surface divided by longitudinal sulcations; tail short, compressed, carinated; foot narrow, tripartite.

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## Genus TESTACELLA, Cuvier, 1800.

The twenty species are mostly European, and the differences in the form of the shell upon which they are distinguished are so small, that it is probable they are, for the most part, local varieties rather than species. Several species are found in European tertiaries. On the habits of Testacella, see "Structural and Systematic Conchology," iii, 11, 12.

T. MAUGEI, Fér. Pl. 1, figs. 1–3.

Animal varying in color from grayish black through various shades of brown; rarely greenish or white. Length, 3 inches.

Shell oval-oblong, with nearly parallel margins, a little dilated anteriorly; columella wide, callous, not truncate in front; epidermis greenish or brownish. Length, 13–17 mill.

*England, France, Portugal, Canaries, Madeira, Azores.*

This is *T. Burdigalensis*, Gassies, *T. oceanica* and *T. Canariensis*, Grateloup. As a fossil it has received the names of *T. Deshayesii*, Michaud, and *T. Altæ-Ripæ*, Grat.

T. EPISCIA, Bourg. Pl. 1, figs. 4–6.

Shell auriform, ovate, margins rounded; whorls 1½, the apex small, smooth, body-whorl irregularly striate-sulcate; columella flattened, curved. Length, 9 mill. *Nice, France.*

T. COMPANYONII, Dupuy. Pl. 1, figs. 7, 8.

Shell ovately auriform, the sides somewhat compressed, narrowed in front, convex above and strongly irregularly striate; spire rather small, obtuse, somewhat produced posteriorly; aperture slightly narrowed anteriorly, rounded posteriorly, columella callous, subtruncate anteriorly; epidermis grayish black, interior whitish pearly. Length, 17 mill.

*Eastern Pyrenees.*

It is *T. Canigonensis*, Gratel.

T. PASCALI, Bourg. Pl. 1, fig. 9–11.

Shell solid, thick, ovately auriform, upper surface strongly sulcate, corneous; apex minute, produced, smooth; aperture ovate, with a superior sinus at the junction of the columella and outer lips, columella much thickened above, subtruncate below. Length, 10 mill. *France (Dep. Haute-Loire).*

Pretty closely related to the preceding species.

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T. BISULCATA, Risso. Pl. 1, figs. 12, 13.

Shell ovately auriform, narrowing in front, depressed, planulate above, and regularly finely striate; the minute, rudimentary spire produced; columellar margin depressed, narrower and subtruncate anteriorly; epidermis reddish brown, rarely whitish, interior subpearly. Length, 5–7 mill.

*S. France, N. Italy.*

Grateloup has named it *T. Galloprovincialis.*

T. WILLIAMSIANA, Nevill. Pl. 1, figs. 16, 17.

A subfossil form, 5 mill. long, recently obtained at Mentone; it is nearly allied to *T. bisulcata*, but some differences will become apparent upon comparing the figures of the two species.

T. GESTROI, Issel.

Ovately trigonal, subpellucid, light corneous; slightly convex and irregularly concentrically rugose above; apex minute, smooth, strongly recurved, adhering to the columella; columella white, translucent, narrow, curved, and slightly twisted, almost reaching the base of the aperture, subtruncate.

Length, 5·5 mill.; lat., 4 mill.

*Island of Sardinia.*

I have not been able to consult the original description and figures of this species.

T. BOURGUIGNATI, Massot. Pl. 1, figs. 20–22.

Shell oblong-ovate, not thick, corneous and striate above; apex small, obtuse, recurved, not prominent, close to the posterior margin, but extending beyond it; columellar margin rather thin, flattened, curved, subtruncate in front.

Length, 7·5 mill.

Around "*La Preste*," *Eastern Pyrenees.*

T. FISCHERIANA, Bourg. Pl. 1, figs. 14, 15.

Shell ovate, slightly convex, rugosely striate and corneous above; apex smooth, well-curved, separated from the columella, whitish, curved, anteriorly deflexed, not truncated.

Length, 6 mill.

*Constantine, Algiers.*

It is *T. bisulcata*, var. *major*, of Gassies and Fischer's Monograph; its very close relationship to that species is seen at a glance.

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T. HALIOTIDEA, Drap. Pl. 1, figs. 23–28, 29–31, 35, 36.

Shell oval-auriform, depressed, rugosely striate, with a thin, readily deciduous epidermis; apex minute, very short, not separated from the columellar margin; aperture rounded, usually dilated anteriorly; columella and outer margin forming a distinct angle at their junction; interior whitish pearly.

Length, 6–10 mill.

*Western Europe*, *Algiers*, *Madeira*, *Canaries*; var. *trigona* at *Havana*.

This is *T. Europæa*, Roissy, *T. Galliæ*, Oken. The above description is of the typical form; there are several varieties, some of which differ from it as much as do some of the preceding so-called species from *T. bisulcata*.

The Vars. as enumerated by Pfeiffer are: Var. *major*; Var. *elongata*; Var. *scutulum*, Sowb. (figs. 29–31), of which *T. Anglica*, Grat., is a synonym; Var. *albina*; Var. *trigona*, Gassies and Fischer (figs. 35, 36), inhabiting (introduced) Havana.

T. SERVAINI, Massot. Pl. 1, figs. 32–34.

Small, ear-shaped, oblong, thin; distinctly striate and light corneous above; apex smooth, very minute, not prominent, approximating the columellar margin; columellar margin curved, dilated above, deflexed, attenuated and not truncate below.

Length, 4·5 mill.

"*La Preste*," *Eastern Pyrenees*.

T. DRYMONIA, Bourg. Pl. 1, figs. 37, 38.

Trigonal, pellucid, concentrically striate and corneous above; apex minute, strongly recurved, separated from the columella; columellar margin broad above, attenuating below. Length, 7 mill.

*Isle of Capri*, *Bay of Naples*.

It is *T. haliotidea*, Costa.

T. BRONDELI, Bourg. Pl. 1, figs. 39, 40.

Shell small, trigonal-ovate, convex and concentrically rugose above, pellucid; spire very small, smooth, recurved, adhering to the columella; aperture rounded below, dilated above; columella white, twisted, curved, deflected, not reaching the base of the aperture nor truncate. Length, 4 mill.

Around *Bona*, *Algiers*.

Too closely allied to the preceding species.

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T. Pecchiolii, Bourg. Pl. 1, figs. 41, 42.

Shell rather narrow, elongate, slightly convex, corneous and rugosely striated above; whitish and slightly concave within; apex minute, recurved, acute, smooth; columella deflexed, very slightly arcuate. Length, 5 mill.

*Italy*, frequent near *Florence*.

This is *T. haliotidea* of many of the older Italian authors, according to Bourguignat: it appears to me to be very nearly allied to *T. bisulcata*.

T. Beccarii, Issel. Pl. 1, figs. 43, 44.

Shell trigonally ovate, oblique, anteriorly arcuate, posteriorly acuminate, flattened and concentrically rugosely striated above, corneous, yellowish within; apex acute, slightly curved, smooth, columella incurved, whitish. Length, 6·5 mill.

*Ripoli*, near *Florence*, *Italy*.

Marchioness Paulucci, who was unable to obtain specimens at the above locality, found there numerous individuals of *T. Pecchiolii*, and she conjectures that it is an abnormal form of the latter.

? T. Dikrangensis, Godwin-Austin. Pl. 1, figs. 18, 19.

Shell dextral, ovate, very flat, solid, the lines of growth well marked, with a dark brown epidermis, the apex cap-shaped, rather produced, and much curved.

Major diameter 0·50 inch, minor diam. 0·25 inch.

Animal not seen.

*Assam*.

Two shells were found in a damp low piece of forest near the Dikrang River, close under the village of Pachitah. "The shell is a peculiar form, the body-whorl spreading out and overlapping in front, giving the shell a limpet-like shape. Without a knowledge of the animal it is very difficult to say in what genus it should be placed, but it is probably a *Helicarion* form. The shell, however, so much resembles *Testacella*, that I have placed it temporarily in that group."

T. vagans, Hutton.

Shell auriform, subspiral, depressed, imperforate; elongately oval, the sides nearly parallel, the anterior end rather broader than the posterior; columellar margin callous; apex subspiral,

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posterior; pale horny, striated with growth-lines. Length of aperture, 0·37; breadth, 0·22.

Animal (in spirit) above slate-gray, gradually passing into yellowish white on the sides; sole yellowish white; the sides rather marbled with gray.

*New Zealand.*

Unfigured. The shell is said to resemble that of *T. Maugei;* also *Daudebardia Novæ-Zealandiæ*, with which Prof. Hutton at first confounded it, but the animal of the latter species he subsequently ascertained to be quite different.

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*Unidentified and Doubtful Species.*

T. Stabilei, Pini. (Desc. not accessible to me.) *Italy.*

T. Peletti, Massot. (Desc. not accessible to me.)

*Vernet-les-Bains, E. Pyrenees.*

## Genus DAUDEBARDIA, Hartmann, 1821.

### Section Rufina, Clessin.

D. rufa, Drap. Pl. 2, figs. 45–47.

Shell perforate, depressed, transversely dilated, slightly striate, very shining, corneous or rufous; spire moderate, sublateral; whorls 3, the last (in adults) elongated, not angulated; aperture large, rounded oval. Length, 5·5 mill.

*Germany, Switzerland.*

D. Hassiaca, Clessin. Pl. 2, figs. 56, 57.

Shell umbilicated, ovate, much depressed, thin, diaphanous, fulvous, lightly striate; whorls 3, rapidly increasing, with well-impressed suture; aperture oblique, rather small and narrow for the genus. Length, 3·5 mill.

*Cassel.*

Smaller, with less dilated body-whorl, consequently smaller, narrower aperture than *D. rufa.*

D. Heldii, Clessin. Pl. 2, figs. 73, 74.

Openly umbilicated, suborbicular-oblong, smooth, incremental striæ slight, irregular, very pellucid, shining, golden-colored; whorls rapidly increasing, the last not dilated, suture well-impressed. Length, 3·5 mill.

*Bavaria.*

Closely allied to the preceding species.

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D. LETOURNEUXI, Bourg. Pl. 2, figs. 82–84.

Shell very minute, much elevated, umbilicated, vitriniform, shining, hyaline; above narrowly radiately striulate, below smooth; whorls 2½, rapidly increasing, with well-impressed sutures, the last large, oblique, convex below.

L. 2·25, alt. 1·25 mill.

*Bona, Algiers.*

Immediately recognized by its small size and Vitrina-like aspect.

D. NUBIGENA, Bourg. Pl. 2, figs. 85–87.

Shell umbilicated, much depressed, whorls 3, slightly convex, with strongly impressed sutures, undulatingly striate above; aperture narrowly oval, the margins joined by a thin callus.

Length, 5 mill.

*Algiers.*

D. NIVALIS, Benoit. Pl. 2, figs. 71, 72.

Shell umbilicated, subdepressed, vitreous, hyaline, diaphanous, very fragile, substriate near the suture; greenish horn-color; aperture ovately lunate, oblique. Diam. maj., 4 mill.

*Sicily.*

Resembles a Hyalinia in appearance.

D. GRANDIS, Benoit. Pl. 26, fig. 2.

Shell with deep umbilicus, convex, nearly smooth, shining, broadly oval, nearly rounded, whorls 3, suture well-marked, aperture large, rounded-oval, peristome subcontinuous.

Length, 8 mill.

*Palermo.*

Has not the auriculate form of *D. brevipes*, and the aperture is broader and spire more convex than *D. rufa*.

D. MONTICOLA, Benoit. Pl. 26, fig. 1.

Shell minute, umbilicated, shining, transparent, aperture rounded-ovate. L. 3 mill., diam. 1·5 mill.

*Mt. St. Martino, near Monreale, Sicily.*

Differs from the preceding species by its smaller size, less dilated aperture, more elongated form.

D. HALICIENSIS, Westerlund.

Shell umbilicated, umbilicus spirally dilated to the aperture, oblong-ovate, diaphanous, greenish hyaline, thinly distantly

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striate; whorls more than 3, the last one greatly increasing, dilated in front; suture margined; spire almost half the diameter of the shell; aperture obovate, outer lip slightly arcuate, not extending beyond the shell, inner lip slightly curved behind.

L. 4, lat. 3, alt. 1·3 mill.

*Galicia.*

An unfigured species. Differs from *D. nivalis* in its wider umbilicus, striæ, more ovate aperture, scarcely exceeding half the length of the shell, more converging margins, etc.

D. Isseliana, Nevill. Pl. 2, figs. 54, 55.

Related to *D. rufa*, from which it is distinguished by its greater proportional breadth, caused by the much more rapidly increasing, slightly convex whorls; the apex is less central, the texture a trifle stouter and more polished; the aperture instead of being ovally rounded, is regularly transversely oblong, the outer margin being much more gradually rounded; and the columellar much less oblique, thicker, and altogether more prominent, more subangulate at its base. *D. nubigena*, Bourg., is even nearer; but is a less elongately produced shell, less appressed, the aperture more rounded and not subangulate at the columella, which is more oblique and less prominent.

*Mentone* (subfossil).

D. Lederi, Böttger. Pl. 2, fig. 59.

Shell large, umbilicated, unguiform, elliptically oval, spire scarcely exceeding a fourth of the total length; whorls 2½.

Length, 6·5 mill.

Animal blackish violet above, lighter on the sides, white beneath. Length, 13 mill.

*Transcaucasia.*

Resembles *D. rufa*, but is larger, more reddish brown, the spire much smaller.

D. Böttgeri, Clessin. Pl. 2, figs. 75, 76, 79.

Shell very narrowly perforate, tectiform, elliptically oval; diaphanous, shining, light corneous; obsoletely striate; spire very small, with profound sutures; whorls 2½, the last very large.

Length, 5 mill. *Crimea.*

The animal is blackish violet, with two darker lines on the back and one on each side; on the sides the color fades, the foot being grayish white, marked with black.

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D. SICULA, Benoit. Pl. 2, figs. 77, 78.

Shell perforate, oblong, rounded in front, diaphanous, shining; apex lateral, scarcely elevated, obtuse; whorls 3, the last very large; aperture rather broadly oval.

L. 4·5, diam. 2·75–3, alt. 1·25 mill. *Sicily.*

*Vitrina elongata*, Calcara, is a synonym.

D. BREVIPES, Drap. Pl. 2, figs. 50, 62–64.

Shell perforate, depressed, subauriform, thin, smooth, diaphanous, transversely dilated, orange-red or chestnut-colored; spire very small, lateral; volutions nearly 3; aperture large, ovate. Length, 5 mill.

*Germany*, *Switzerland*, *Northern Italy.*

Includes *D. Maravignæ*, Mandral., *D. longipes*, Zieggl.

D. ATLANTICA, Bourg. Pl. 2, figs. 88–90.

Shell perforate, whorls 2, rapidly increasing, with well-impressed sutures, lightly striate, thin, very fragile, transparent; amber-colored; spire slightly elevated; aperture very large, transversely oblong, somewhat oblique, rather straight margined above, more convex below. L. 3 mill., alt. 1·25 mill.

Near *Bona*, *Algiers.*

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D. PLATYSTOMA, Letourneux. Unfigured. *Kabylia.*

D. CHAROPIA, Letourneux. Unfigured. *Bona*, *Algiers.*

D. ELATA, Mühlf. No description, figure or locality.

Section PSEUDOLIBANIA, Stefani.

D. HEYDENI, Böttger. Pl. 2, figs. 67, 68, 51–53.

Shell small, rimate, elongately ovate, subdepressed, shining, not pellucid, yellowish green; spire moderate; the whorls 2, rapidly increasing, with profound suture, last whorl somewhat dilated, obtusely angulated on the periphery; peristome membranaceous, the membrane broad, extremities separated by the spire, without callous or membranous connection upon it.

Length, 3·5 mill.

*Caucasia.*

*D. Pawlenkoi*, Böttger (figs. 51–53), is a synonym.

D. SIEVERSI, Böttger. Pl. 2, figs. 58, 60, 61.

Small, perforate-rimate, elongate oblong, margins subparallel, subdepressed, fragile, pellucid, shining, light olivaceous brown; above rather flattened, below subglobose; spire moderate, whorls

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2, rather rapidly enlarging, with profound sutures; aperture rounded ovate, somewhat oblique, columellar margin subreflected.

Length, 2·25 mill.

*Transcaucasia.*

D. TARENTINA, Stefani et Pantanelli. Unfigured. *Tarento.*

Section LIBANIA, Bourguignat.

Described by Bourguignat, in 1866, under the name of Moussonia, and subsequently altered as above because that name had been used by Semper in 1865.

D. LANGI, Pleiffer. Pl. 2, figs. 69, 70.

Shell much depressed, with a minute lateral spire; shining, fulvous, diffusely callous within; whorls 2, the last angularly depressed; columellar margin reflexed, covering the umbilicus.

Length, 6·5 mill.

*Hungary.*

D. TRANSSILVANICA, Bielz. Pl. 2, 65, 66.

More narrowly ovate than the preceding species, with very minute terminal spire; whitish or orange-brown, shining; whorls 2, the last angularly depressed; peristome cartilaginous.

Length, 2·5 mill.

*Transylvania.*

This species also bears the MS. name *D. Bielzi*, Parreyss.

D. SAULCYI, Bourg. Pl. 2, figs. 80, 81.

Shell haliotiform, smooth, shining, diaphanous, amber-colored, ovate; whorls 2½, the spire minute, body-whorl elongated; columella callously reflected over the umbilicus.

Length, 5 mill. *Syria.*

This is *D. Berytensis*, Grat., *D. Syriaca*, Roth.

D. GAILLARDOTI, Bourg. Pl. 2, figs. 91–94.

Shell thin, smooth or slightly striate, fragile, diaphanous; spire small, sublateral, whorls 2½, the last narrowly elongated.

Length, 2 mill.

*Syria.*

Animal dusky orange or bluish, with dark maculations, foot whitish, narrow.

D. CALOPHANA, Westerlund. (Unfigured.) *Galicia.*

D. NOVOSEELANDICA, Pfeiffer. (Unfigured.) *New Zealand.*

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Section ISSELIA, Bourguignat.

D. SARDOA, Issel. Pl. 2, figs. 48, 49.

Somewhat depressed, slightly convex above, narrowly umbilicated, transversely dilated, thin, shining, straw-colored; spire very small, sublateral, whorls 2¼, the last large, elongated, depressed; aperture widely ovate, very large, the outer margin submembranaceous. Length 4 mill., alt. 1 mill.

*Island of Sardinia.*

The Marchioness Paulucci (Mater. pour servir, etc., 23) calls attention to the resemblance of the figures of this shell to *D. Sicula*, Benoit. She has not seen specimens.

## Genus CHLAMYDEPHORUS, Binney.

C. GIBBONSI, Binney. Pl. 2, fig. 95.

Animal elongate, slender, cylindrical; dark orange, thickly marbled with dark olive-brown, except on the middle line of the back and margin of the foot, where the maculations are not so thick and the ground-color more apparent, sole of foot whitish; a round orifice on the dorsal posterior surface, from which radiate furrows; ocular tentacles short, retractile; below the inferior, shorter tentacles are two subpellucid prolongations of the sole of the foot, somewhat resembling a third pair of tentacles; no jaw; teeth 27·1·27, the central differing from the others only in being smaller, resembling the dentition of Glandina, the lingual ribbon long and broad, the denticles in about 52 chevron-shaped rows. Length of animal, 3 inches.

Internal thick shelly plate in fragments, supposed to be hexagonal when perfect. Length, 3 mill.

*Natal.*

The type and only known specimen is in the Museum of the Philadelphia Academy. Mr. Gibbons, who collected it, states that when quiescent the head is withdrawn completely, the two margins of the foot are brought together and the tail doubled under.

## Genus PLECTROPHORUS, Férussac.

P. ORBIGNII, Férussac. Pl. 2, figs. 96–98.

This appears to be an imaginary creature, as no specimens have occurred to the malacologists who have so carefully explored the



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Canary Islands for mollusks. Wollaston writes of it: "It was both described and figured (in 1819) in 'Férussac's Histoire Naturelle, Mollusques,' as Teneriffan, on the authority of M. d'Orbigny, who, nevertheless made no sort of allusion to it in his subsequent Canarian catalogue, issued in 1839! We are almost driven, therefore, to conclude that d'Orbigny must have had some particular reason for refusing admission to it in the portion of Webb and Berthelot's publication which he undertook to compile; yet since he ignores the subject altogether, and the diagnosis still remains uncommented upon, and uncancelled, in the great work of Férussac, I scarcely see how we can exactly pass it over, even though the silence of M. d'Orbigny may appear somewhat ominous as regards its true Teneriffan claims.

"The most salient character for which the *P. Orbignii* would seem to be conspicuous (but which appears identical with the main feature of the Testacellas) is the presence of a small external Ancylus-like, crotchet-shaped shell, which is carried on the hinder region of the body, at a short distance from the tip, between which and the posterior edge of the shell there is a rough dorsal band. The animal, however, is said distinctly to possess a shield which Testacella does not."— *Testacea Atlantica*, p. 310.

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P. CORNINUS, Bosc. *Habitat unknown.*

Probably the figure in Férussac represents *Arion ater* with some hardened mucus on its subcaudal gland which has been mistaken for a shell.

P. COSTATUS, Bosc. (Unfigured.) *Maldives.*

Only known from a drawing and description sent by a traveler to Favanne.

## Genus SELENOCHLAMYS, Böttger.

S. PALLIDA, Böttger. Pl. 26, figs. 3, 4.

Animal resembling Daudebardia, but without a shell; mantle small, posterior, circumscribed by a sulcus; respiratory orifice on the right side, and anterior; caudal carina elevated, very short; sole of the foot narrow, tripartite.

Length, 13 mill; mantle, ·75 mill. long and 1·5 mill. wide.

*Kutais* (*Transcaucasia*).

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## Family *OLEACINIDÆ.*

Animal with short head, with a retractile, often produced buccal sac; eyes at the tips of long, cylindrical, retractile peduncles; inferior tentacles moderate; foot elongate, narrow, simple posteriorly. Lingual teeth numerous, the transverse rows more or less curved; central teeth inconspicuous, marginals aculeate, or with a single long recurved apex.

Shell spiral, fusiform, corneous, more or less transparent, rarely longitudinally banded; aperture longitudinal, narrow; columella twisted or truncated anteriorly.

Living in humid situations; carnivorous. For the habits of the Oleacinidæ, see "Structural and Systematic Conchology," iii, 14.

*Synopsis of Genera.*

### Genus STREBELIA, Crosse and Fischer, 1868.

Shell bulliform, with very short spire, the last whorl nearly the total length of the shell; columella simple, arcuate, not truncate, peristome simple, acute.

Animal much larger than the shell. 1 Mexican species. (*Physella*, Pfr., 1861, not Hald., 1842, and *Spirobulla*, Ancey, 1881, are synonyms.)

### Genus OLEACINA. Bolten, 1798.

Shell oval-oblong, with a thin, olivaceous, shining epidermis; last whorl large, sometimes attenuated at the base; aperture elliptical-oblong, half or more than half the length of the shell; columella twisted or truncate below, outer lip simple, frequently somewhat inflected in the middle. 150 species, mostly American and subtropical. Fossil, Cret.—; Europe.

(*Polyphemus*, Montf., 1810; *Glandina*, Schum., 1817; *Cochlicopa*, Fér., 1819; *Pfaffia*, Behn., 1844.)

Section Boltenia, Pfr., 1878. (*Typical group.*)

Section Varicella, Pfr., 1855. Shell longitudinally plicate or striate, occasionally varicosely thickened, with a few longitudinal colored strigations; columella obliquely truncate, outer lip slightly compressed in the middle. *Mexico, Central America, West Indies.*

Section Melia, Albers, 1850. (*Turritæ*, Pfr., 1878.) Shell fusiformly turreted, longitudinally subcostate; whorls rather

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flattened; columella twisted, obliquely truncate; aperture narrow, semioval; lips simple, submarginate within.

Section GLANDINA (Schum.), H. and A. Adams, 1855. (*Euglandina*, Crosse and Fischer, 1870.) Shell oblong-oval, fusiform, corneous, epidermis thin, shining; spire more or less elevated, of 6 or 8 whorls; columella thin, arcuated, truncated at base; aperture rather narrow, longitudinal; lip simple, sharp.

Animal much longer than the shell, when extended; oculiferous tentacles deflected at the tips, beyond the eyes; inferior tentacles much shorter, also deflected; lips elongated, tentacular. Predaceous. The largest species of the family belong to this group, the shells sometimes attaining a length of over 3 inches. *Tropical America;* a few species in the *Southern United States.*

Section POIRETIA, Fischer, 1883. Animal with feebly developed labial palpi; shell like Glandina. *Europe.*

Section SELASIELLA, Strebel, 1878. Shell very small, glassy, vertically striated; columella truncated; labial palpi wanting. Stomach simple, as in Streptostyla (it is double in Glandina). 3 species. *Mexico.*

## Genus STREPTOSTYLA, Shuttleworth, 1852.

Shell oval-oblong, subcylindrical, last whorl proportionally very large; aperture elongated, narrow behind; outer lip simple, inflected in the middle; columella with a thickened spiral plication at the base.

Animal with but slightly developed tentacles; labial palpi moderate; foot short; stomach simple. 50 species. *Tropical America.*

The shells generally resemble Oleacina, but the columella has a basal fold, instead of being simply truncated.

Section STREPTOSTYLA (typical). Shell longitudinally striated.

Section CHERSOMITRA (Shuttleworth), Albers, 1860. Shell cylindrical, smooth, shining, usually yellowish; aperture more than half the length of the shell; outer lip distinctly inflected.

### Subgenus PETENIA, Crosse and Fischer, 1868.

Shell with lengthened spire, columella twisted.

Animal with tentacles and buccal lobes as in Glandina; foot truncated behind, having a mucus-pore at the tail.

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### Genus PSEUDOSUBULINA, Strebel and Pfeffer, 1882.

Shell turriculated, narrow, longitudinally plicate-striate, whorls numerous, forming a long spire, last whorl rather small compared to the length of the shell; columella truncated at the base; peristome simple; aperture small. *Mexico.*

The shells resemble Subulina, from which it may perhaps be distinguished by its ribs and button-like apex, but the animal has no jaw (agnathous).

### Genus VOLUTAXIS, Strebel and Pfeffer, 1882.

Columella with a basal fold; not truncate; whorls, including the embryonal ones, longitudinally ribbed. Differs from the preceding group in apex and columella. It is difficult to separate this and the preceding group conchologically from Subulina and Spiraxis; indeed, I would not attempt to do this. I have included here merely the species which Strebel places in these new groups, partly from his examination of their lingual dentition, partly from the analogy of external features. The dentition of too few of the species of Spiraxiform shells has been examined to permit any generalizations. It should be remarked that several Stenogyræ examined by Binney possessed the characters which entitle them to their usually assigned position, whilst a single Spiraxis from Haiti was without jaw, and had the Glandiniform dentition.

### Genus RAVENIA, Crosse, 1873.

Shell allied to Volutaxis, minute, imperforate, subhyaline, columella spirally twisted, outer lip bent inwards, and armed with a strong tooth in the middle. 1 species.

*Los Roques*, near *Curaçoa*, *West Indies.*

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## Genus STREBELIA, Crosse and Fischer.

S. BERENDTI, Pfeiffer. Pl. 3, fig. 12, magn. 2·5 times.

Shell smooth, shining, fulvous horn-color; spire short, obtuse, whorls 2½; columella receding, the aperture wide below.

Length, 6 mill.

*Vera Cruz, Mexico.*

The only species of the genus.

## Genus OLEACINA, Bolten, 1798.

### Section BOLTENIA, Pfeiffer.

O. VOLUTA, Chemn. Pl. 4, fig. 39.

Smooth, shining, greenish, yellowish or orange-brown; whorls 7–8, rather flattened, suture linear, white-margined.

Length, 51 mill.

*West Indies.*

The largest species of the section; it is *O. glans*, Brug., and *O. olivacea*, Schum.

O. ATTENUATA, Pfeiffer. Pl. 4, fig. 42.

Thin, smooth, very shining, orange-brown, numerously longitudinally, arcuately grooved, suture simple, smooth, whorls 7, rather flat. Length, 31 mill.

*Central America.*

O. CYANOZORIA, Gundlach. Pl. 4, fig. 43.

Shell thin, rather smooth, very shining, pellucid, reddish orange; whorls 7½, suture distinctly margined; outer lip slightly compressed in the middle. Length, 40 mill.

Mountains near *Trinidad, Cuba.*

Differs from *O. oleacea* by its margined suture, and columella more strongly curved in front.

O. OLEACEA, Fér. Pl. 4, figs. 46, 45.

Shell thin, very shining, smooth, pellucid, light yellowish or greenish brown; whorls 7–8, suture not margined, or but very slightly so; outer lip compressed in the middle.

Length, 29–37 mill.

*Cuba, Haiti.*

*O. straminea*, Desh. (fig. 45), is sometimes designated as var. *major*. For its distinction from *O. cyanozoria*, see that species.

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O. TRANSLUCIDA, Gundlach. Pl. 4, figs. 33, 38.

Rather thin, very shining, translucid, yellowish brown, irregularly crowded with longitudinal sulcations; whorls 8, suture submarginate. Length, 18 mill.

*Guantanamo, Cuba.*

O. PETHIONIS, Weinland. Pl. 11, fig. 83.

Rather thin, subpellucid, shining, obsoletely arcuately striate, suture simple; corneous, with distant, irregular, sinuous chestnut strigations. Length, 22 mill.

*Port au Prince, Haiti.*

O. GLABRA, Pfeiffer. Pl. 4, fig. 44.

Thin, smooth, shining, light corneous, with distant reddish strigations, fading out on the body-whorl; whorls 8, suture finely crenulately margined; outer margin of aperture not incurved in the middle. Length, 28 mill.

*Porto Rico.*

O. INTERRUPTA, Shuttleworth. Pl. 4, fig. 34.

Shell thin, very smooth and shining; corneous, irregularly strigate with reddish chestnut, with a white band on the periphery, and less conspicuous ones towards the base; whorls 7½, suture narrowly margined, scarcely plicate. Length, 27 mill.

*Porto Rico.*

O. AMBIGUA, Pfeiffer. Pl. 4, figs. 35, 37.

Shell rather solid, smooth, shining, orange-red, with a yellowish band near the suture; whorls 7, suture simple. Length, 22 mill.

*Cordova and Huatusco, Mexico.*

*O. Berendti*, Pfeiffer (fig. 37), is a synonym; it is described from a fresh specimen, whilst the original description is apparently from a dead shell denuded of epidermis.

O. BELLULA, Crosse and Fischer. Pl. 4, fig. 36.

Shell rather thin, smoothish, slightly striated, pellucid; whorls nearly 8, suture granosely margined; light-orange red.

Length, 21·5 mill.

*Mexico.*

O. LINDONI, Pfeiffer. Pl. 4, fig. 41.

Shell oblong, attenuated below, smooth, shining, light orange-brown; whorls 7–8, suture submargined; columella callously thickened. Length, 19–26 mill. *Cuba.*

*O. onychina*, Morelet, is a synonym.

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O. ORYSACEA, Rang. Pl. 27, fig. 2.

Elongate, subcylindrical, pellucid, smooth, shining, orange-brown, last whorl narrow, cylindrical, long. Length, 16–20 mill.

*Cuba.*

*O. regularis*, Gundlach is a synonym.

O. ASSIMILIS, Reeve. Pl. 4, fig. 40.

Smooth, pellucid, very shining, reddish corneous; whorls 5½, suture margined. Length, 20 mill.

*Venezuela.*

O. OBTUSA, Pfeiffer. Pl. 4, fig. 55.

Smooth, pellucid, corneous; whorls 5½, suture margined, obsoletely crenulated. Length, 26 mill.

*Real Llejos, Nicaragua.*

Very closely allied to the preceding species.

O. SOLIDULA, Pfeiffer. Pl. 27, fig. 1; Pl. 4, fig. 49.

Shining fulvous, subpellucid, whorls 6, suture submarginate. Length, 13 mill.

*Cuba; New Providence, Bahamas.*

*O. paragramma*, Morelet, is a thinner variety, subhyaline, spire slightly more acute; *O. folliculus*, Gould is another synonym. I have copied a figure from Reeve (fig. 49) which differs considerably from the typical form.

O. INCERTA, Reeve. Pl. 4, fig. 53.

Shell livid corneous, smooth, shining; whorls 5–6, suture slightly marginate. Length, 12 mill.

*Cuba.*

Differs from the preceding species by its shorter spire and more ventricose base.

O. SATURATA, Gundlach. Pl. 27, fig. 3.

Fusiformly oblong, thin, glabrous, shining, pellucid, corneous or orange-brown, spire short, obtuse, suture submarginate. Length, 11·3 mill.

*Cuba.*

Now first figured, from a specimen.

O. SUBULATA, Pfeiffer. Pl. 4, fig. 54.

Shell smooth, pellucid, orange-brown, with an opaque line below the suture. Length, 12 mill.

*Cuba.*

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O. CLERIEI, Weinland. Pl. 4, fig. 48.

Shell smooth, brightly shining, yellowish brown, whorls 7. Length, 11 mill.

Woods near *Jeremie*, *Haiti*.

O. POEYANA, Pfeiffer. Pl. 4, fig. 50.

Shell smooth, shining, yellowish corneous, with a few longitudinal grooves; suture nearly simple, whorls 6, the first four regularly increasing, the penultimate much longer, the last decidedly descending in front. Length, 12–13 mill.

*Cuba*.

O. OTTONIS, Pfeiffer. Pl. 4, fig. 47.

Shell yellowish corneous, shining; whorls 6½, upper ones finely longitudinally plicate, suture crenulate. Length, 13 mill.

*Cuba*.

*O. semistriata*, Morelet, is a synonym.

O. INCISA, Pfeiffer. Pl. 4, fig. 51.

Fusiformly oblong, smooth, shining, light yellowish brown; whorls 7, subplicate, plicæ evanescent on the body-whorl, suture smooth, submarginate. Length, 15 mill.

*Cuba*.

O. PAIVANA, Pfeiffer. Pl. 4, fig. 52.

Shell sinistral, thin, smooth, with here and there an impressed longitudinal line, pellucid, orange-brown; whorls 7–8, the last descending, suture linear; aperture very narrow, dilated at the base; columella narrowly truncate, outer lip sinuous, receding at the base. Length, 15 mill.

*Haiti*.

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*Unfigured and Doubtful Species.*

| | |
|---|---|
| O. NYSTIANA, Pfr. Length, 47 mill. | *Hab. unknown.* |
| O. SMITHIANA, Pfeiffer. | *Haiti.* |
| O. OBLONGA, Pfeiffer. | Near *Vera Cruz*, *Mexico.* |
| O. CONULARIS, Pfeiffer. | *Mexico.* |
| O. PULCHELLA, Pfeiffer. | *Chiapa*, *Mexico.* |
| O. MARGARITACEA, Pfeiffer. | *Cordova*, *Mexico.* |
| O. FOLLICULARIS, Morelet. | *Isle of Pines*, *Cuba.* |
| O. WRIGHTII, Pfeiffer. | *Vinales and Bayamo*, *Cuba.* |
| O. TERES, Pfr. | *Buena Vista*, *Distr. Bayamo*, *Cuba.* |

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O. ANTONIANA, Pfr. (*Achatina hyalina*, Anton, not Rang). *N. America.*

O. MINUTISSIMA, Guppy. *Trinidad, W. I.*

O. CRENULATA (Sowb.?), Anton. *Central America.*

O. SICILIS, Morelet. *Guajaibon, Cuba.*

Section VARICELLA, Pfeiffer.

O. ORIZABÆ, Pfeiffer. Pl. 3, fig. 1.

Olivaceous brown, shining, longitudinally striated, with irregular, lighter-colored varices; whorls 7½, suture slightly margined. Length, 42 mill.

*Orizaba, Mexico.*

O. MONILIFERA, Pfeiffer. Pl. 3, fig. 2.

Thin, pellucid, regularly costate, striæ becoming evanescent in the middle of the penultimate whorl; rosy orange, with a few chestnut, light-margined strigations; whorls 7, suture granulose. Length, 29 mill.

*Coban and Vera Paz, Guatemala; Cordova and Chiapa, Mexico.*

*O. rubella*, Morelet, is a synonym. Crosse and Fischer describe a Var. β, lighter-colored, somewhat narrower, sculpture distinct on the penultimate whorl, etc.

O. CORDOVANA, Pfr. Pl. 3, fig. 4.

Longitudinally plicate, shining, corneous, varices subflexuose, light chestnut; whorls 7½, suture marginate, nodosely crenate. Length, 29 mill.

*Cordova, State of Vera Cruz, Mexico.*

O. LEUCOZONIAS, Walch. Pl. 3, fig. 5.

Longitudinally striate, shining, chestnut-color, with several remote undulating irregular white strigations. Length, 46 mill.

*Martinique, West Indies.*

This is *Achatina albolineata*, Lam.

O. DOMINICENSIS, Gmelin. Pl. 3, fig. 3.

Thin, closely costulate-striate, shining, reddish rose-color, with wide, distant, undulating chestnut strigations, whorls 7. Length, 34 mill. *Haiti.*

The synonyms are *Bulla turrita* and *B. maculata*, Chemn., *Achatina fuscolineata*, Lam., and *Polyphemus Bruguiereus*, Bowd.

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O. SPECIOSA, Pfeiffer. Pl. 3, fig. 11.

Finely plicate, shining, corneous, with irregular distant subflexuous white varices; whorls 8, suture elegantly nodulous-crenate. Length, 29 mill.

*Cordova, State of Vera Cruz, Mexico.*

O. PROCERA, Adams. Pl. 3, fig. 9.

Finely plicate, costate, shining, diaphanous, whitish, with longitudinal wide irregular chestnut blotches, interrupted on the last whorl about the periphery; whorls 10, suture well impressed. Length, 30 mill.

*Jamaica.*

Figured from an authentic specimen.

O. PHILIPPIANA, Pfeiffer. Pl. 3, fig. 10.

Narrowly costulate, rather thin, shining, grayish orange, with wide chestnut irregular strigations; whorls 9, irregularly varicose, suture impressed, submarginate. Length, 29 mill.

*Jamaica.*

Var. ELEGANS, Adams. Costulæ finer, strigations narrower.

O. GRIFFITHSI, Adams. Pl. 3, fig. 8.

Finely costulate, yellowish, corneous, sparsely strigate with chestnut; whorls 10, the last impressed in the middle, outer lip dilated towards the base, somewhat thickened within, whitish. Length, 22 mill.

*Jamaica.*

O. LIGATA, Adams. Pl. 3, fig. 7.

Longitudinally closely striate, shining, orange-brown, with distant irregular chestnut strigations, suture impressed, whorls 8, varicose, the last sulcately constricted in the middle. Length, 17 mill.

*Jamaica.*

O. DENTICULATA, Weinland. Pl. 11, fig. 99.

Shell thin, pellucid, milky hyaline, with impressed arcuate striæ; whorls 7, suture simple; outer lip compressed in the middle, where it is furnished with a small tooth. Length, 17 mill.

*Port au Prince, Haiti.*

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O. JAMAICENSIS, Pfeiffer. Pl. 3, fig. 6.

Finely costulate, shining, whitish, with occasional chestnut strigations; whorls 10, frequently varicose, the last becoming smooth below the periphery, suture crenulate, submarginate.

Length, 22 mill.

*Jamaica.*

O. TRINITARIA, Gundl. Pl. 3, fig. 13.

Shell thin, pellucid, yellowish brown, irregularly sculptured by impressed striæ and occasional varices; whorls 8, with moderate suture. Length, 27 mill.

Mountains near *Trinidad, Cuba.*

O. GUNDLACHI, Pfeiffer. Pl. 3, fig. 14.

Thin, smooth, pallid corneous, indistinctly varicose; whorls 7, suture lightly crenulated. Length, 15 mill.

*Letran, Cuba.*

Smaller than the preceding species, with more acute apex, the varices indistinct, suture crenulated, the outer lip more rounded.

O. STIGMATICA, Shuttleworth. Pl. 3, fig. 18.

Thin, obsoletely thinly striate, shining, corneous, with distant longitudinal chestnut strigations; whorls 7, suture very narrowly margined and minutely crenulated; outer lip chestnut-margined.

Length, 14 mill.

*Cordova, State of Vera Cruz, Mexico.*

O. VENUSTA, Pfeiffer. Pl. 3, fig. 16.

Thin, pellucid, closely striate, rosy, with white and chestnut longitudinal strigations; whorls 7, suture margined; columella subvertical, twisted, lip sometimes white-margined within.

Length, 18 mill.

*Jamaica.*

The color is sometimes a uniform yellowish rose.

O. NEMORENSIS, Adams. Pl. 3, fig 15.

Shell thin, shining, pellucid, closely longitudinally striate, rose-orange, with irregular longitudinal chestnut strigations; whorls 7, suture submargined; outer lip receding below the middle. Length, 20 mill.

*Jamaica.*

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O. INGALLSIANA, Adams. Pl. 3, fig. 28.

Light brownish, with a few dark chestnut strigations, longitudinally numerously minutely striate; whorls 7, suture impressed, finely thread-like. Length, 19 mill.

*Jamaica.*

O. SIMILIS, Adams. Pl. 3, fig. 17.

Differs from *O. nemorensis* by its more rectilinear spire, more polished surface, with a few very minute striæ, and wider brown markings; spire shorter and stouter than in *O. Phillipsii*.

Length, 18 mill.

*Jamaica.*

O. NITIDA, Adams. Pl. 3, fig. 19.

Shell polished, shining, reddish, with four or five varicose darker strigations in each whorl; whorls 7–8, suture well impressed. Length, 24 mill.

*Jamaica.*

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*Unfigured Species.*

| | |
|---|---|
| O. BIPLICATA, Weinland and Martens. | *Haiti.* |
| O. DELICATULA, Shuttl. | *Vera Cruz, Mexico.* |
| O. COSTULOSA, Adams. | *Jamaica.* |
| O. PTYCHORAPHE, Weinland and Martens. | *Haiti.* |
| O. GUADELOUPENSIS, Pfeiffer. | *Guadeloupe, W. I.* |
| O. BOUCARDI, Pfeiffer. | *San Martin, Mexico.* |
| O. TEXTA, Weinland and Martens. | *Jeremie, Haiti.* |
| O. ANGIOSTOMA, Adams. | *Jamaica.* |
| O. UNICOLOR, Adams. | *Jamaica.* |

Section MELIA, Albers.

O. SIMPLEX, Strebel. Pl. 3, fig. 20.

Somewhat pellucid, shining, corneous, with a pellucid band at the suture, becoming subturgid on the last whorl; whorls 6½, with small close plications, stronger towards the suture, and close fine spiral impressed lines. Length, 31 mill.

*Oajaca, Mexico.*

*Glandina turris*, Martens (not Pfeiffer), is a synonym.

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O. MULTISPIRA, Pfeiffer. Pl. 3, fig. 25.

Thin, shining, longitudinally striulate, corneous, with indistinct irregular pale strigations; whorls 10, subplicate below the suture—which is crenulately margined. Length, 25 mill.

*Juquilla, Mexico.*

O. GAYANA, Adams. Pl. 3, fig. 26.

Thin, pellucid, yellowish, very finely plicatulate; whorls 7, with short, remote reddish strigations below the simple suture.

Length, 21 mill.

*Jamaica.*

O. PORTORICENSIS, Pfr. Pl. 3, fig. 21, magn. $\frac{4}{3}$.

Shining, smooth, with irregular impressed longitudinal lines, light corneous, with irregular chestnut strigations.

Length, 21 mill.

*Porto Rico, W. I.*

*O. Rüsei*, Pfeiffer, is a synonym.

O. TEREBRÆFORMIS, Shuttleworth. Pl. 3, fig. 22, magn. $\frac{4}{3}$.

Shell thin, very smooth, shining, with remote irregular impressed longitudinal lines; reddish corneous, with occasional chestnut strigations; whorls 7–8, suture well impressed.

Length, 13 mill.

Near *Ceiba*, and *Rio Blanco*, *Porto Rico.*

O. SULCULOSA, Shuttleworth. Pl. 3, fig. 29.

Smooth, thin, shining, with rather strongly impressed lines; light corneous, with narrow chestnut strigations; whorls 7.

Length, 10 mill.

*Porto Rico.*

Smaller, and differing in sculpture from the preceding species.

O. PHILLIPSII, Adams. Pl. 3, fig. 30, magn. $\frac{5}{4}$.

Longitudinally striulate, shining, light corneous, with occasional chestnut strigations which do not reach the base of the last whorl; whorls 8, suture margined, subcrenulate.

Length, 20 mill.

*Jamaica.*

O. CURVILABRIS, Pfeiffer. Pl. 3, fig. 23, magn. $\frac{3}{2}$.

Diaphanous, shining, finely costulate, yellowish brown, remotely strigate with white; whorls 8, suture margined.

Length, 16 mill. *Jamaica.*

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O. PROPINQUA, Adams. Pl. 3, fig 31.

Ribbed, striate, shining, corneous, with subarcuate, usually white-margined, chestnut strigations; whorls 7–8.

Length, 14 mill. *Jamaica.*

Figured from a small specimen in the Swift Collection.

O. PERPLEXA, Adams. Pl. 3, fig. 27.

Finely striate, subpellucid yellowish brown, with chestnut, somewhat curved lines; whorls 6½, suture impressed.

Length, 8 mill.

*Jamaica.*

Figured from a specimen in the Philadelphia Academy.

O. VICINA, Adams. Pl. 3, fig. 32.

Resembles a diminutive *O. Phillipsii*, but the longitudinal striæ closer, nowhere fasciate with chestnut, the subsutural marginal line more remote, the spire shorter. Length, 12 mill.

*Jamaica.*

O. ARCUATA, Pfeiffer. Pl. 3, fig. 24.

Subulate, whorls 8, flattened, smooth, polished, with rather distant fine impressed longitudinal striæ; yellowish corneous with an occasional chestnut strigation. Length, 1 inch.

*Jamaica.*

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*Unfigured Species.*

O. PERLUCENS, Guppy. *Dominica, W. I.*

O. BLANDIANA, Adams. *Jamaica.*

O. PROXIMA, Adams. *Jamaica.*

Section GLANDINA, H. and A. Adams.

O. ISABELLINA, Pfeiffer. Pl. 5, fig. 65.

Shell thin, pellucid, minutely spirally striate; whorls 6, suture margined by an impressed line. Length, 26 mill.

*Mexico.*

O. AURANTIACA, Angas. Pl. 5, fig. 67.

Moderately thin, smooth, shining, bright tawny orange, darker towards the base of the columella; whorls 5½, suture impressed, purplish. Length, 23 mill.

*Costa Rica*, hilly country.

Somewhat allied to *O. isabellina*, but smaller, of different color and texture, quite smooth, and has the banded suture.

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O. ORNATA, Pfeiffer. Pl. 5, fig. 57.

Crowded with regular longitudinal costulæ, pellucid, orange-red; whorls 8, suture margined by a crenulated sulcus.

Length, 72 mill.

*New Granada.*

*O. costulata*, Pfeiffer, is a synonym.

O. TRUNCATA, Gmelin. Pl. 4, fig. 56; Pl. 5, figs. 58, 60.

Shell solid, with crowded longitudinal plicate striæ and occasional sulci; whorls 6, suture subcrenulately margined; ash-rose or rose-yellow. Length, 65 mill.

*So. Carolina to Florida.*

This is *O. striata*, Desh., and *Polyphemus glans*, Say.

O. PARALLELA, W. G. Binney. Pl. 5, fig. 59.

Shell solid, shining, rose-yellow or whitish, cylindrically elevated, the sides compressed, subparallel; longitudinally plicate-striate. Length, 55 mill.

*Louisiana, Texas.*

Is possibly only a variety of the last species.

O. BULLATA, Gould. Pl. 6, fig. 75.

Thin, pellucid, shining, reddish corneous to whitish, closely longitudinally plicate-striate; whorls 5, the last inflated, suture undulating, submargined with white. Length, 38 mill.

*Louisiana.*

Possibly a form of *O. truncata*, Gmel.

O. STRIATA, Müller. Pl. 5, fig. 64.

Solid, longitudinally finely striate-plicate; whorls 7–8, suture margined, crenulated; yellowish white, or light pink-yellow, inconspicuously narrowly striped with reddish brown.

Length, 56 mill.

*Bolivia, Cayenne, N. Granada.*

The synonyms are *Helix tenera*, Gmel., *H. incumbens*, Dillw., *O. Mülleri*, Gray, and *O. dactylus*, Brod.

O. LINEATA, Strebel. Pl. 8, fig. 3.

Yellowish flesh-color, with margined suture; the longitudinal plicate striæ crossed by fine spiral lines. Length, 45–49 mill.

*Mexico.*

Somewhat related to the preceding species in coloring, but differs in size and sculpture.

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O. STRIGOSA, Martens. Pl. 8, fig. 2.

Closely plicately striate, crossed by minute spiral striæ, rosy yellow, occasionally narrowly chestnut-striped; suture crenulated, margined. Length, 54 mill.

*Mexico.*

Strebel considers this a variety of *O. striata.*

O. ALABASTRINA, Albers. Pl. 5, fig. 61.

Solid, closely regularly plicate-striate, whitish, shining; whorls 7, suture margined, denticulate-crenulate. Length, 51 mill.

*Tabasco, Central America.*

O. MARMINII, Desh. Pl. 5, fig. 72.

Shell thin, pellucid, white, broadly longitudinally plicate, suture elegantly crenated. Length, 53 mill.

*Habitat unknown.*

O. SEMISULCATA, Desh. Pl. 5, fig. 63.

Regularly plicate-striate, becoming smooth at the base, orange-brown, distantly strigate with chestnut. Length, 37 mill.

*Habitat unknown.*

O. FLEXUOSA, Pfeiffer. Pl. 5, fig. 68.

Solid, longitudinally flexuously plicate-striate; fulvous, with narrow chestnut strigations; whorls 7, the last deflected towards the aperture, suture subcrenated. Length, 53 mill.

*Aux Cayes, Haiti.*

O. TURRIS, Pfeiffer. Pl. 5, fig. 62.

Closely slightly costate-striate, rather thin, diaphanous, pink white; whorls 7, suture margined; aperture subdilated below. Length, 43 mill.

*Mazatlan.*

O. STREBELI, Angas. Pl. 5, fig. 69.

Thin, shining, finely longitudinally striate, the striæ nearly obsolete on the last whorl; olive-green; whorls 5½, suture simply impressed. Length, 23 mill.

*Costa Rica.*

O. ANOMALA, Angas. Pl. 5, fig. 66.

Thin, shining, yellowish olive-green, dark brown towards the apex, flatly longitudinally striate, striæ becoming obsolete on the lower portion of the whorls, especially the last; whorls 7, suture granulated. Length, 35 mill.

*Costa Rica*, hilly regions.



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O. CYLINDRUS, Martens. Pl. 8, fig. 8.

Closely, lightly ribbed-striate, somewhat thin, white; whorls 7, apex very obtuse; suture elegantly crenulated, but without a distinct impressed line. Length, 39 mill.

*Columbia, S. A.*

O. LUCIDA, Strebel. Pl. 8, fig. 4.

Orange-brown, acutely and closely plicate; whorls 5¼, suture lightly crenate. Length, 41 mill.

*New Granada.*

O. FILOSA, Pfeiffer. Pl. 6, fig. 76.

Solid, longitudinally closely threaded-plicate, light rosy; whorls 6, suture subsimple; aperture reddish. Length, 39 mill.

*Orizaba, Mexico.*

Var. MAJOR, Crosse and Fisher. Reddish brown, columella strongly curved. Length, 42 mill.

O. ALBERSI, Pfeiffer. Pl. 6, fig. 84.

Shell thin, closely longitudinally striate, pellucid, light reddish; whorls 5½–6, suture subsimple. Length, 30 mill.

*Mazatlan, West Coast of Mexico.*

O. TURGIDA, Pfeiffer.

Orange-brown; lightly, closely striated, scarcely shining; whorls 7, suture smoothly crenulated. Length, 30 mill.

An unfigured species. *Juquila, Mexico.*

O. CONFERTA, Pfeiffer. Pl. 8, fig. 6.

Somewhat thin, pellucid, yellowish, shining, closely plicate-striate; whorls 8, suture submargined. Length, 25 mill.

*Juquila, Mexico.*

O. DIFFICILIS, Crosse and Fischer. Pl. 6, fig. 78.

Rather thin, longitudinally striate, body-whorl becoming smooth below the middle; light orange-red; whorls 7½, suture rather irregularly impressed. Length, 20 mill.

*Mexico.*

A slightly contorted columella reminds one of the genus Streptostyla.

O. TEXASIANA, Pfeiffer. Pl. 6, fig. 82.

Moderately solid, pellucid, closely longitudinally striate, orange-rose color; whorls 6, suture minutely denticulated, lighter-colored. Length, 29 mill. *Texas.*

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O. PSEUDOTURRIS, Strebel. Pl. 8, fig. 7.

Like *O. isabellina*, but with closer, more distinct striæ, not tuberculate at the suture; whorls 6½; columella strongly twisted, not inflated above, but excavated. Length, 26 mill.

*Juquila, State of Oajaca, Mexico.*

Described from a single imperfect specimen.

O. TORTILLANA, Pfeiffer. Pl. 6, fig. 79.

Moderately solid, with regular, close, longitudinal striæ, pellucid, shining, light corneous, with irregular, opaque, yellowish brown strigations and maculations; whorls 7½, suture submarginate. Length, 20 mill.

*Tortilla, Central America.*

O. YUCATANENSIS, Pfeiffer. Pl. 8, fig. 10.

Hyaline fulvous; closely longitudinally plicate-striate; whorls 6, suture margined, denticulated. Length, 23 mill.

*Yucatan.*

This is *O. Largillierti*, var., of Crosse and Fischer. It may be compared with *O. carnea*, Pfeiffer.

O. NANA, Shuttleworth. Pl. 6, fig. 80.

Rather thin, regularly closely sulcate-costulate, fuscous, light-banded at the suture; whorls 6. Length, 13 mill.

*Cordova, Mexico.*

O. SUBEMARGINATA, Desh. Pl. 6, fig. 77.

Shell thin, hyaline, longitudinally, thinly, obsoletely striated; brownish red; whorls 6½, the last obtuse at base, suture subcanaliculate and thinly plicate. Length, 42 mill.

*Habitat unknown.*

O. MITRIFORMIS, Angas. Pl. 7, fig. 94.

Moderately thin, shining, irregularly obsoletely striated, striæ finer and closer on the upper whorls; olive-chestnut, with a narrow yellow zone next the suture, aperture lilac; whorls 5. Length, 28 mill. *Costa Rica.*

Described from a single specimen collected by the late W. M. Gabb.

O. POLITA, Strebel. Pl. 8, fig. 14.

Rather thin, translucent, very shining, brownish yellow, longitudinally plicate. Length, 16 mill. *Mexico.*

Described from a single specimen.

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**Decussated.*

O. LIGNARIA, Reeve. Pl. 6, figs. 81, 85.

Rather thin, closely striate, decussated by remote, impressed spiral lines, which are slighter towards the base, scarcely shining; red-brown, with irregular chestnut strigations; whorls 8, suture rudely crenulated. Length, 94–116 mill.

*Mexico.*

Strebel considers this a form of *O. Sowerbyana.*

O. FUSIFORMIS, Pfeiffer. Pl. 6, fig. 88.

Thin, closely longitudinally costulate, reticulated by minute spiral lines, orange-red, with deeper-colored apex, irregularly strigate; whorls 7–8, suture margined; columella and margin of aperture reddish. Length, 87 mill.

*Coban and Vera Paz, Central America.*

Var. STRAMINEA, Crosse and Fischer. Straw-color, strigate with light orange-red, apex and outer margin of aperture reddish, interior pearly white.

O. SOWERBYANA, Pfeiffer. Pl. 6, fig. 86.

Rather thin, diaphanous, closely longitudinally plicate, granularly decussated by irregular spiral striæ; orange-red, with distant chestnut strigations; whorls 7, suture crenulated, white-margined. Length, 88 mill.

*Mexico.*

O. ESTEFANIÆ, Strebel. Pl. 8, fig. 5.

Differs in form principally from *O. Sowerbyana*, of which Strebel originally considered it a variety. Length, 60 mill.

*Mexico.*

O. AURATA, Morelet. Pl. 6, fig. 83.

Solid, opaque, shining, violaceous orange, granulately decussated; whorls 6, suture white, margined, denticulated; margin of aperture somewhat thickened, pearly within. Length, 87 mill.

*Vera Paz, Guatemala* (in woods).

O. DISTINGUENDA, Tryon. Pl. 8, fig. 13.

This shell, figured by Strebel as a narrow variety of *O. aurata*, is immediately separable from that species by its slim form.

Length, 72 mill.

*Mexico.*

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O. CORONATA, Pfeiffer. Pl. 6, fig. 87.

Rather thin, subdiaphanous, closely longitudinally plicate, irregularly decussated by distant impressed spiral lines, which become obsolete below the middle of the body-whorl, reddish, with chestnut maculations becoming lighter below; whorls 7, suture coronated with distant teeth. Length, 88 mill.

*Mexico.*

O. GUTTATA, Crosse and Fischer. Pl. 7, fig. 92.

Rather thin, subdiaphanous, somewhat shining; longitudinally plicate-striate, granularly decussated by distant spiral impressed lines, evanescent below the middle of the last whorl; reddish brown, with irregular chestnut strigations and yellowish white maculations; whorls 7, suture unequally, subdistantly dentate-coronate; aperture somewhat pearly, shining, light reddish brown. Length, 69 mill.

*Puebla, Mexico.*

O. LIEBMANNI, Pfeiffer. Pl. 7, fig. 91.

Solid, longitudinally plicate, closely obsoletely decussated by spiral lines in the interstices; whitish; whorls 8, suture elegantly crenulated. Length, 67 mill.

*Mexico.*

*O. striata*, Reeve, is a synonym.

O. PLICATULA, Pfeiffer. Pl. 7, fig. 96.

Thin, diaphanous, slightly shining, closely longitudinally plicately striate, obsoletely decussated by spiral lines; brownish red; whorls 7, suture margined, minutely crenulated.

Length, 60 mill.

*Andes, New Granada.*

Var. CINNAMOMEO-FUSCA. With obsolete lighter maculations.

*Venezuela.*

Var. PINICOLA. Rather smaller, thin, moderately shining, obsoletely rudely plicate, rather distantly decussated by spiral striæ; orange-red, with very few white varices; suture irregularly dentate-crenate. Length, 50 mill. *Guatemala.*

O. FULMINEA, Férussac. Pl. 7, fig. 90.

Finely decussated, alternately maculated and strigated with reddish violet and white; whorls 8–9, suture waved.

Length, 64 mill. *Habitat unknown.*

A remarkable species, the type of which was in the Delessert Collection.

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O. SUBVARICOSA, Albers. Pl. 7, fig. 89.

Thin, subarcuately plicate, closely spirally striate; light reddish, irregularly strigate with white and orange-brown, subvaricose; whorls 7, suture whitish, crenulated. Length, 61 mill.

*Venezuela.*

O. UHDEANA, Martens. Pl. 9, fig. 26.

Closely rather obsoletely plicate, partially reticulately decussated by impressed spiral lines; somewhat shining; rosy brown, with a few brown and white strigations; whorls 7, suture irregularly dentate. Length, 67 mill.

*Vera Cruz, Mexico.*

Said to be closely allied to *O. subvaricosa*, Albers. It may possibly also equal *O. Coulteri*, Gray.

O. COGNATA, Strebel. Pl. 8, fig. 9.

Rather solid, light brownish yellow, darker towards the apex, whitish within, becoming brownish red towards the margin, occasionally strigately thickened; sculpture as in *O. Uhdeana*, but more feebly marked. Length, 56 mill.

*Tehuantepec, Mexico.*

O. NYMPHA, Crosse and Fischer. Pl. 7, fig. 97.

Rather solid, longitudinally, irregularly ribbed-striate, with undulating impressed spiral lines; whorls 8, suture irregularly, shortly denticulate-crenate. Length, 60 mill.

*Mexico.*

O. ROSEA, Férussac. Pl. 7, fig. 95.

Somewhat attenuated at both extremities, orange-rose color, closely striated, granulated between the striæ; whorls 6½, suture margined and denticulated. Length, 60 mill.

*Central America.*

Var. $\beta$. Yellowish orange.

Var. $\gamma$. Subelongate, ovately fusiform, suture and aperture red-margined.

The synonymy includes *O. Cumingii*, Beck, and *O. Petiti*, var., Strebel, who unites it with that species.

O. PETITI, Deshayes. Pl. 7, fig. 98.

Rather solid, very closely longitudinally plicate-striate, nar-

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rowly spirally striate; light orange-yellow; whorls 6, suture crenulately margined. Length, 40 mill.

*Vicinity of Lake Nicaragua.*

Strebel unites this with the preceding species.

O. VANUXEMII, Lea. Pl. 7, fig. 99.

Thin, pellucid, decussated by longitudinal and spiral striæ to about the middle of the body-whorl; orange-rose color; whorls 6, suture crenulated. Length, 53 mill.

*Mexico, Texas.*

O. SACCATA, Pfeiffer. Pl. 9, fig. 22.

Rather solid, plicately striate, decussated by very minute spiral lines, sculpture smoother below, on the body-whorl, the base somewhat distended; reddish corneous; whorls $6\frac{1}{2}$, suture closely crenulated, thread-margined. Length, 56 mill.

*Ecuador.*

O. AMŒNA, Martens. Pl. 7, fig. 100.

Closely striulate, decussated by fine undulating spiral lines, shining, rosy orange; whorls 7, suture crenate. Length, 45 mill.

*Mexico.*

Var. β. PLICULOSA. Larger, more solid, with obsoletely impressed longitudinal plications, the spiral lines obsoletely whitish corneous.

Strebel makes this species a variety of *O. Audebardi.*

O. INSIGNIS, Pfeiffer. Pl. 7, fig. 1.

Somewhat solid, rather distantly distinctly plicate, the interstices finely decussately granulated; rose-red, the plications lighter; whorls 7, suture margined by an impressed line, and regularly denticulate. Length, 48 mill.

*Jalisco, Mexico.*

*O. Liebmanni*, form D? of Strebel.

O. LONGULA, Crosse and Fischer. Pl. 9, fig. 20.

Rather thin, obsoletely plicately striate, decussated by finer spiral striæ; orange-straw color, white within; whorls 7, suture elegantly crenulated, not margined. Length, 45 mill.

*R. San Juan, Mexico.*

O. RADULA, Strebel. Pl. 8, fig. 15.

Longitudinally closely plicate, denticulating the suture; whorls 7, color? (only specimen denuded of epidermis). Length, 40 mill.

*Tehuantepec, Mexico.*

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O. CARMINENSIS, Morelet. Pl. 9, fig. 25.

Rather solid, closely plicate, very minutely decussated, brownish rose-color to whitish, here and there strigate with chestnut; whorls 7, suture narrowly granularly margined. Length, 48 mill.

*Isl. Carmen, Lake Yucatan.*

A variety $\beta$: yellowish white and smaller, is described by Crosse and Fischer.

O. DECUSSATA, Deshayes. Pl. 9, fig. 28.

Moderately solid, closely longitudinally striate, decussated by thinner spiral striæ; reddish brown or corneous; whorls 7, suture margined and crenulated; columella twisted.

Length, 45 mill.

*Mexico, Texas.*

*O. corneola*, W. G. Binney, is a synonym. The shell is closely related to the preceding species.

O. EQUADORIANA, Pfeiffer. Pl. 9, fig. 19.

Somewhat solid, finely regularly plicate-striate, sometimes dichotomous, spirally interruptedly very minutely lineated; shining, reddish corneous; whorls 7, suture thread-margined and rudely granulated. Length, 62 mill.

*Val de Pilaton, Ecuador.*

O. TENELLA, Strebel. Pl. 8, fig. 11.

Shell thin, pellucid, plications less crowded than in *O. decussata*, flatter and unequal, the spiral striæ less distinct; light yellowish pink, darker towards the suture and on the peristome and columella; whorls 6, suture margined; columella slightly twisted. Length, 35 mill.

Near *Vera Cruz, Mexico.*

O. GHIESBREGHTI, Pfeiffer. Pl. 8, figs. 16, 18.

Thin, closely longitudinally plicate, decussated by very narrow spiral striæ; orange-white, peristome darker-bordered; whorls 7, turgid and subangulated above, suture crenulately thread-margined; columella obliquely plicate towards the base.

Length, 52 mill.

*Chiapa, Mexico.*

Var. $\beta$: MINOR. Very light olivaceous yellow, whorls 6, interior pearly white, peristome bordered with light rose-color,

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columella obliquely plicate at the base. Described and figured by Crosse and Fischer.

O. AUDEBARDI, Deshayes. Pl. 9, fig. 27.

Shell thin, hyaline, light orange-red, lightly plicate-striate, crossed by thin spiral striæ; whorls 6½, suture crenately margined; columella concave, twisted. Length, 62 mill.

*Central America.*

O. MIRADORENSIS, Strebel. Pl. 8, fig. 17.

Shell translucent, shining, brownish flesh-color; irregularly longitudinally plicate, the plicæ becoming sharper towards the suture and obsolete towards the base, crossed by rather sharp spiral striæ; suture crenulated, margined, subhyaline.

Length, 46 mill.

*Mirador, Mexico.*

First figured by Strebel as a form of *O. Audebardi.*

O. INDUSIACA, Pfeiffer. Pl. 9, fig. 21.

Moderately solid, rugosely longitudinally striate, crossed by close revolving striæ; yellowish brown, with here and there the remnants of a chestnut-colored epidermis; whorls 5½, suture subcrenate; last whorl subinflated, the spiral sculpture obsolete below the middle; columella subvertical; aperture pearly within.

Length, 43 mill.

*Oajaca, Mexico.*

O. CARNEA, Pfeiffer. Pl. 7, fig. 93.

Moderately solid, diaphanous, shining, decussated by striæ which become obsolete inferiorly; orange-rose color; whorls 6, suture closely, elegantly denticulated. Length, 27 mill.

*Central America, Mexico.*

This is *O. turris*, Desh., and *O. Yucatanensis*, Strebel.

O. CYLINDRACEA, Phillips. Pl. 8, fig. 12.

Moderately thick, pellucid, finely longitudinally striated, the striæ crossed by very minute lines; very pale flesh-color; whorls 7, suture crenulated. Length, 29 mill.

*Yucatan.*

Only known by the outline figure, of which I give a copy; it is very probably identical with the preceding species—over which it has priority of publication.

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*Unfigured and Undetermined Species.*

O. BINNEYANA, Pfr. Like *O. striata*, Müll.; spire shorter, columella arcuate, etc. *Vera Paz, Guatemala.*

O. CANDIDA, Shuttleworth. A little like *O. turris*, Pfr.; form more like that of *O. algira*, Brug. *Mexico.*

O. COULTERI, Gray. I have not access to the publication in which this species is described and figured. It is possibly a large form of *O. Uhdeana*, Martens.

O. CONSPERSA, Pfeiffer. *Hab. unknown.*

O. LARGILLIERTI, Pfeiffer. May be compared with *O. Yucatanensis*, Pfr. *Yucatan.*

O. DECIDUA, Pfeiffer. *Juquila, Mexico.*

O. BRUGUIEREA, Fér., O. GLANDULA, Fér., O. MARMOREA (Perry) Fér., O. TIARELLA, Fér., O. FIMBRIATA, Beck, O. GRACILIS, Beck—all undescribed and undetermined.

Section POIRETIA, Fischer, 1883.

O. ALGIRA, Brug. Pl. 5, figs. 70, 71; Pl. 6, figs. 73, 74.

Thin, closely longitudinally striate; epidermis light yellowish brown; whorls 6–7, rapidly increasing, subplanulate, suture narrowly margined, minutely crenulated. Length, 40 mill.

*Marine Provinces of Austria, Dalmatia, Morea, Algiers, Italy.*

The synonymy includes *O. Poireti*, Fér., *O. striata*, Montf., *O. cornea*, Brumati, *O. Bonensis*, Albers, *O. angustata*, Villa.

Var. MINGRELICA, Böttger. Pl. 6, fig. 73. *Transcaucasia.*

Var. COMPRESSA, Mousson. (Unfigured.) *Corfu, Cephalonia, Epirus.*

Dr. Pfeiffer distinguishes this and the following variety as doubtful species.

Var. DILATATA, Ziegler. Pl. 6, fig. 74. Rather thin, closely costulate-striate; yellowish white; whorls 6–7, suture finely crenulated, white-margined. Length, 36 mill. *Sicily, Algiers.*

*O. tumida*, Villa is a synonym.

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O. DELESSERTI, Bourguignat. (Unfigured.) *Corfu.*

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Section SELASIELLA, Strebel, 1878.

O. JOAQUINÆ, Strebel. Pl. 9, fig. 33.

Shell moderately solid, translucent, shining, yellowish, with brownish yellow growth-lines, irregularly longitudinally plicate, suture marked by a transparent zone, last whorl slightly contracted in the middle, somewhat sack-like below.

Length, 8·5 mill.

*Jalapa, Mexico.*

O. PERPUSILLA, Pfeiffer. Pl. 9, fig. 32.

Thin, longitudinally arcuately striate, pellucid, shining, yellowish; whorls 5, suture profound, narrowly margined.

Length, 4·5 mill.

*Mirador, State of Vera Cruz, Mexico.*

O. MODESTA, Pfeiffer. (Unfigured.) Near *Vera Cruz, Mexico.*

Pfeiffer writes "Conf. *O. perpusilla.*" It is about the same size.

Genus STREPTOSTYLA, Shuttleworth, 1852.

*Typical Section.*

S. PERUVIANA, Lamarck. Pl. 11, fig. 97.

Thin, subpellucid, longitudinally elegantly striate, decussated with spiral striæ, with spiral folds or lamellæ at the base of the shell, suture subcanaliculate; white, with chestnut clouds and streaks. Length, 48 mill.

*Peru.*

It is *Helix pretiosa*, Fér.

S. RICHARDI, Pfr. Pl. 11, figs. 85, 86.

Rather thin, diaphanous, closely longitudinally plicate-striate, the striæ becoming obsolete towards the middle of the body-whorl, everywhere closely spirally striate, suture impressed, crenately margined; orange-brown, with angular streaks of dark chestnut. Length, 28 mill.

*Haiti.*

S. NICOLETI, Shuttleworth. Pl. 11, fig. 93.

Rather solid, opaque, longitudinally costulate, the sculpture more prominent near the suture; shining chestnut-colored.

Length, 33 mill.

*Cordova, Mexico.*

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S. BOTTERIANA, Crosse and Fischer. Pl. 11, fig. 95.

Spire gradate, each whorl having a narrow sloping shoulder, bounded by an angle; body-whorl widely compressed in the middle; longitudinally plicate-striate; tawny chestnut.

Length, 8·5 mill.

*Orizaba, Mexico.*

Distinguished at once by its peculiar form.

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*Unfigured Species.*

S. MOHRIANA, Pfr. *Orizaba, Mexico.*

S. DUBIA, Pfr. *Chiapa, Mexico.*

Pfeiffer, in his "Nomenclator," considers both of these doubtful species.

Section CHERSOMITRA, Martens.

S. DELATTREI, Pfeiffer. Pl. 10, fig. 49.

Rather solid, smooth, shining; fulvous, with irregular distant longitudinal curved chestnut lines. Length, 38 mill.

*Guatemala.*

Var. $\beta$. Slightly smaller, with more numerous chestnut streaks.

S. QUIROZI, Strebel. Pl. 11, fig. 92.

Rather solid, opaque, shining, smooth, yellowish chestnut-color, with a small sutural yellowish white band.

*Mexico.*

Smaller-sized than *S. Delattrei*, with shorter spire and a little more prominent rounded shoulder, darker-colored, and without chestnut strigations.

S. SHUTTLEWORTHI, Pfeiffer. Pl. 10, figs. 52, 53.

Thin, smooth, shining, with irregular impressed lines, suture sublacerated; yellowish brown, with variciform occasional chestnut streaks. Length, 33 mill.

*Cordova* and *Chiapa, Mexico.*

I figure, in addition to the type form, a more ventricose, darker-colored variety (fig. 53).

S. SALLEI, Crosse and Fischer. Pl. 10, fig. 50.

Rather thin, shining, obsoletely striulate; suture lacerated; olivaceous; with variciform light luteous strigations and maculations, aperture grayish white. Length, 40 mill.

*Orizaba, Mexico.*

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S. EDWARDSIANA, Crosse and Fischer. Pl. 10, fig. 51.

Narrower than the preceding species, shining, striulate, suture widely margined; fulvous olivaceous, with light chestnut varici-form strigations, aperture bluish white. Length, 36 mill.

*Orizaba, Mexico.*

S. SIMILIS, Strebel. Pl. 10, fig. 54.

Rather thin, translucent, shining, yellowish brown, with narrower or broader darker streaks; with impressed longitudinal striæ, visible near the suture; no spiral sculpture; on the body-whorl there is a narrow colorless sutural zone.

*Orizaba, Mexico.*

S. CINGULATA, Crosse and Fischer. Pl. 10, fig. 55.

Thin, smooth, shining; pale olivaceous brown, with irregular darker strigations; suture with short, impressed lines; aperture bluish white. Length, 25 mill.

*Tuxtla, State of Vera Cruz, Mexico.*

S. NIGRICANS, Pfeiffer. Pl. 10, fig. 56.

Moderately solid, polished, very minutely striate; chocolate-color, with narrow, distant fulvous strigations, suture light-margined, the base yellowish brown, interior lighter chocolate. Length, 35 mill.

*Vera Paz, Central America.*

Var. $\beta$. Smaller and lighter-colored. *Tabasco, Mexico.*

S. MITRÆFORMIS, Shuttleworth. Pl. 10, fig. 57.

Moderately solid, obsoletely striulate, polished, chocolate-colored with a few wide yellowish brown strigations, base yellowish brown, spire lighter-colored, with chestnut apex, suture margined with an obsolete impressed line. Length, 26 mill.

*Cordova, Mexico.*

Smaller, narrower, the spire slightly more produced, and the suture without the colored marginal band of the preceding species.

S. LURIDA, Shuttleworth. Pl. 10, fig. 59.

Shining, obsoletely striulate, suture slightly channeled; olivaceous chestnut, lighter at suture and base. Length, 15 mill.

*Cordova, Mexico.*

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S. FULVIDA, Crosse and Fischer. Pl. 10, fig. 60.

Smooth, shining, scarcely pellucid; orange-chestnut, with a grayish white sutural band. Length, 16 mill.

*Orizaba, Mexico.*

S. GLANDIFORMIS, Crosse and Fischer. Pl. 10, fig. 61.

Smooth, shining, pellucid; olivaceous brown, with a few distant irregular chestnut strigations, suture white-margined; aperture bluish white; lip simple, thickened, white.

Length, 14 mill.

*Orizaba, Mexico.*

S. BOCOURTI, Crosse and Fischer. Pl. 10, fig. 62.

Thin, smooth, pellucid, shining, scarcely striulate; orange-brown; suture profoundly impressed, canaliculate.

Length, 14 mill.

*Coban, Guatemala.*

Var. $\beta$. Fuscous, narrower, spire longer. Length, 13·5 mill.

*Mexico.*

Var. $\gamma$. Major. Length, 24 mill. *Mexico.*

S. BOUCARDI, Pfeiffer. Pl. 10, fig. 72.

Thin, smooth, shining, suture smooth; dark olivaceous or reddish brown. Length, 17 mill.

*Juquila, Mexico.*

S. SOLOLENSIS, Crosse and Fischer. Pl. 10, fig. 63.

Thin, pellucid, smooth, shining; suture lightly impressed; light olivaceous horn-color, aperture bluish white.

Length, 18 mill.

*Solola, Guatemala.*

S. IRRIGUA, Shuttleworth. Pl. 10, fig. 58.

Thin, shining, obsoletely striulate; yellowish brown, with darker narrow flexuous strigations. Length, 24 mill.

*Cordova, Mexico.*

Smaller and narrower than *S. Delattrei*.

S. TURGIDULA, Pfr. Pl. 10, fig. 65.

Somewhat thin, striulate, shining; suture crenulate; light yellowish brown, with subimpressed, variciform, pellucid strigations; aperture pearly white. Length, 31 mill.

*Cordova, Mexico.*

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S. BLANDIANA, Crosse and Fischer. Pl. 10, fig. 69.

Moderately solid, smooth, with irregular impressed lines; suture subcrenulate; light olivaceous brown, inconspicuously dotted with yellowish, with irregular variciform olivaceous chestnut strigations; interior bluish white. Length, 28 mill.

*Cordova, Mexico.*

Strebel makes this a synonym of *S. coniformis*, Shutt., below.

S. BINNEYANA, Crosse and Fischer. Pl. 10, fig. 68.

Moderately solid, smooth, shining; light olivaceous brown, with irregular inconspicuous yellowish white spots, apex white, interior bluish white. Length, 18·5 mill.

*Totonicapan, Guatemala.*

S. CONIFORMIS, Shuttleworth. Pl. 10, figs. 64, 74.

Somewhat solid, polished, obsoletely striulate, suture subchanneled; yellowish brown. Length, 20 mill.

*Cordova, Mexico.*

Strebel makes *S. Pfeifferi*, C. and F., and *S. Blandiana*, C. and F., both synonyms of this species.

S. PLICATULA, Strebel. Pl. 10, fig. 70.

A wider species than *S. coniformis*, with more convex bodywhorl, and more apparent striæ at the sutures; color somewhat lighter. Length, 18 mill.

*Orizaba, Mexico.*

S. PFEIFFERI, Crosse. Pl. 10, fig. 66.

Moderately solid, smooth, with linear, impressed suture; orange-brown, with irregular darker strigations.

Length, 19 mill.

*Mexico.*

Strebel makes this a synonym of *S. coniformis*, Shuttl. My specimens of the two species are barely distinguishable in form and coloring, the present being darker. It was described by Pfeiffer as *Achatina streptostyla*, and the specific name being subsequently used in a generic sense, Crosse changed it, as above.

S. CRASSA, Strebel. Pl. 10, fig. 71.

Shell thick, opaque; dark orange-brown, lighter at the base, lip-margin moderately broad, yellowish; longitudinally striate, the striæ ridge-like at the sutures. Length, 1 inch.

*Coban, Guatemala.*

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S. SCHNEIDERI, Strebel. Pl. 10, fig. 73.

Shell solid, nearly opaque, polished; yellowish horn-color to light ochre-yellowish, with a few slightly darker strigations; surface covered with irregular, slight striæ, becoming more rib-like at the sutures, where there is a translucent band, defined on the last whorl by a slight groove. Length, 21–25 mill.

*Coban, Guatemala.*

Nearly allied to the preceding species.

S. VIRIDULA, Angas. Pl. 27, fig. 8.

Thin, shining, longitudinally striate on the upper part of the whorls, the striæ becoming almost obsolete on the lower half of the body-whorl; suture subcanaliculate; pale yellowish green. Length, 16 mill.

*Costa Rica.*

S. BOYERIANA, Crosse and Fischer. Pl. 10, fig. 67.

Moderately solid, shining, pellucid, smooth; light olivaceous brown, the suture with an inconspicuous yellowish line. Length, 14 mill.

*Orizaba, Mexico.*

S. CYLINDRACEA, Pfeiffer. Pl. 11, fig. 98.

Smooth, shining; yellowish brown, the linear suture white margined. Length, 13 mill.

*Tortilla, Cent. Am.; Merida, Yucatan.*

*S. ventricosula*, Morelet (from the latter locality), is a synonym.

S. DYSONI, Pfeiffer. Pl. 11, fig. 75.

Thin, smooth, pellucid, shining; yellowish brown. Length, 9·5 mill.

*Honduras.*

Very closely allied to the preceding species.

S. CORNEA, Crosse and Fischer. Pl. 11, fig. 88.

Thin, smooth, pellucid, shining; olivaceous horn-colored. Length, 14 mill.

*Guatemala.*

Not quite so cylindrical in form as the preceding species; yet probably only a variety of it.

S. FLAVESCENS, Shuttleworth. Pl. 11, fig. 76.

Thin, somewhat shining, obsoletely striulate, with slightly crenulated sutures; corneous white, with remote yellowish brown strigations. Length, 16 mill.

*Cordova, Mexico.*

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S. LYMNEIFORMIS, Shuttleworth. Pl. 11, fig. 77.

Thin, striulate; light brownish yellow, with darker narrow strigations. Length, 17 mill.

*Cordova, Mexico.*

S. AURICULACEA, Pfeiffer. Pl. 11, fig. 82.

Rather thin, smooth, pellucid, shining, suture margined; reddish horn-color. Length, 16 mill.

*Cordova, Mexico.*

S. SARGI, Crosse and Fischer. Pl. 11, figs. 78, 79.

Moderately solid, or thin, rather smooth, shining; light olivaceous horn-color, suture white-margined; interior bluish white. Length, 13·5 mill.

*Guatemala.*

Var. $\beta$. Major. Lighter-colored, with fulvous strigations. Length, 14·5 mill.

S. PHYSODES, Shuttleworth. Pl. 11, fig. 89.

Moderately solid, smooth, shining; suture margined; light yellowish brown. Length, 13 mill.

*Cordova* and *Chiapa, Mexico.*

Var. $\beta$. Pallida. Length, 17 mill.

S. VEXANS, Strebel. Pl. 11, fig. 96.

Moderately solid, translucent; bright yellowish brown, with a broad transparent zone at the suture, partly defined by a groove. Length, 8·7 mill.

*Mexico.*

S. CUBANIANA, Orb. Pl. 11, fig. 80.

Rather thin, smoothish, diaphanous, shining; yellowish brown, with subregular distant chestnut lines; suture simple. Length, 28 mill. *Cuba.*

S. EPISCOPALIS, Morelet. Pl. 11, fig. 90.

Moderately solid, longitudinally costulate-striate above, suture smooth, submarginate; yellowish brown, shining. Length, 23 mill. *Cuba.*

S. MORELETIANA, Pfr. Pl. 11, fig. 91.

Moderately solid, smooth, shining, suture distinctly margined; corneous white. Length, 18 mill.

*Cuba.*



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S. SUTURALIS, Pfr. Pl. 11, fig. 84.

Shell thin, pellucid, shining; greenish corneous; the suture profound, chestnut or chocolate-color. Length, 10·5 mill.

*Cuba.*

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*Unfigured Species of Streptostyla.*

S. DELIBUTA, and S. LABIDA, Morelet. *Vera Paz, Guatemala.*
S. MERIDANA, Morelet. *Merida, Yucatan.*
S. COBANENSIS, Tristram. *Guatemala.*
S. SUBCALLOSA, Pfr. *Venezuela.*
S. BULLACEA, Pfr. *Tabasco, Mexico.*
S. BICONICA, S. CATENATA, S. OBLONGA and S. PARVULA, Pfr. *Chiapa, Mexico.*

Subgenus PETENIA, Crosse and Fischer, 1868.

The differential characters are principally found in the soft parts, although the single species presents a peculiarity in its shell in possessing a central spiral band.

S. LIGULATA, Morelet. Pl. 11, fig. 87.

Rather smooth, shining, olivaceous yellow with a median narrow dark chestnut band, suture margined. Length, 15 mill.

*Peten* and *Palenque, Guatemala.*

Genus PSEUDOSUBULINA, Strebel and Pfeffer, 1882.

P. BERENDTI, Pfeiffer. Pl. 9, fig. 35.

Moderately solid, subdiaphanous, yellowish white, closely plicate, whorls 12. Length 12·5 mill,

*Orizaba* and *Mirador, Mexico.*

P. CHIAPENSIS, Pfeiffer. Pl. 9, fig. 36.

Moderately solid, pellucid, shining, yellowish white, closely plicately striate, whorls 9–10, suture subcrenulately margined. Length, 16 mill.

*Chiapa, Mexico.*

P. SARGI, Crosse and Fischer. Pl. 9, fig, 37.

Closely plicately striate, pellucid, shining, rather thin, olivaceous horny; whorls 9, suture slightly crenulated, apex obtuse. Length, 14 mill.

*Guatemala.*

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P. TROCHLEA, Pfeiffer. Pl. 9, fig. 34.

Thin diaphanous, shining, yellowish white, obliquely minutely striate; whorls 10, suture profound. Length, 23 mill.

*Mexico.*

## Genus VOLUTAXIS, Strebel and Pfeffer, 1882.

V. SULCIFERUS, Morelet. Pl. 9, fig. 38.

Subdiaphanous, elegantly longitudinally costulate, light corneous, whorls 8, convex; columella white. Length, 8 mill.

*Guatemala.*

V. BERENDTII, Pfeiffer. Pl. 9, fig. 30.

Rather thin, subhyaline, closely plicate, whorls 8.

Length, 7 mill.

*Mirador*, near *Vera Cruz*, *Mexico.*

Perhaps only a variety of the preceding species. *V. euptyctus*, Pfr. (unfigured), is considered a synonym by Strebel.

V. TENUECOSTATUS, Strebel. Pl. 9, fig. 39.

Distinguished from the two preceding species by its more obtuse apex, fewer whorls and finer ribs.

*Mexico.*

Described from a single specimen.

V. SIMILARIS, Strebel. Pl. 9, fig. 40.

Differs from *V. sulciferus* principally in its narrower, more cylindrical form.

Near *Jalapa*, *Mexico.*

*V. Miradorensis*, Strebel, is possibly an abnormal or local form of *V. similaris*, as suspected by that author.

V. CONFERTECOSTATUS, Strebel. Pl. 9, figs. 41, 42.

Distinguished from the last species by its more slender form, more acuminated spire, higher whorls, and especially by its much finer and more numerous ribs, 55 to 60 in number.

Near *Jalapa*, *Mexico.*

V. INTERMEDIUS, Strebel. Pl. 9, figs. 43, 44.

Resembling the preceding species, but stouter, with about 40 ribs—somewhat impinging on the sutural line.

Near *Jalapa*, *Mexico.*

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V. CONFERTESTRIATUS, Strebel. Pl. 9, fig. 45.

Approaches in form the preceding species, but has the more numerous plications of *V. confertecostatus*, although they are not so strong as in the latter species.

Near *Jalapa*, and *Mirador*, *Mexico*.

V. NITIDUS, Strebel. Pl. 9, figs. 46, 47.

Shell shining, clear yellowish horn-color, with a narrow sutural zone; surface essentially smooth, with distantly marked growth-lines.

*Mexico*.

V. LINEARIS, Pfeiffer. Pl. 9, fig, 48.

Very thin, hyaline, closely striate, whorls 7. Length, 15 mill.

Near *Vera Cruz*, *Mexico*.

V. ACUS, Shuttleworth. Pl. 9, fig. 24.

Shell whitish corneous, sharply, regularly costulate; whorls 12–13, flattened in the middle, very convex near the sutures. Length, 16 mill.

Near *Cordova*, *Vera Cruz*, *Mexico*.

V. MELANIELLOIDES, Gundlach. Pl. 9, fig. 29.

Closely, somewhat arcuately striate, thin, pellucid, yellowish white; whorls 8, somewhat flattened in the middle, very obscurely angulated at the base. Length, 6·5 mill.

*Cuba*.

V. RECTUS, Pfeiffer. Pl. 9, fig. 31.

Rather thin, closely subarcuately plicatulate, somewhat shining, wax-colored; whorls 7, suture impressed; columella slightly callous, with a light superior plication. Length, 5 mill.

*Sierra Monte Christi*, *Haiti*.

V. BLANDI, Crosse and Fischer. Pl. 9, fig. 23.

Thin, diaphanous, obsoletely plicately striate, striæ rather distant, more apparent near the suture; whorls 6, with well-marked suture; light yellowish corneous. Length, 8·5 mill.

*Vera Cruz*, *Mexico*.

## Genus RAVENIA, Crosse, 1873.

R. BLANDI, Crosse. Pl. 22, fig. 1.

Shell imperforate, turriculated, thin, translucent, almost crystalline, and marked by slightly flexuous longitudinal striæ;

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columella with a spiral plication, outer lip externally inflected and strongly angulated in the middle, bearing a strong tooth; yellowish white. Length, 3·25 mill.

*Los Roques* (east of *Curaçoa*) *West Indies.*

I am not aware that the dentition of the mollusk of this curious little shell has been examined, but it has been placed in the Agnatha on conchological grounds by Pfeiffer, Binney, etc.; its general aspect is nearly related to that of Volutaxis.

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## Family *STREPTAXIDÆ.*

Shell heliciform or pupiform, the last whorls generally deviating obliquely from the others.

Animal with a long neck and short tail; superior tentacles long and narrow; labial palpi narrow, moderate. Dentition resembling that of Testacellidæ. No jaw.

Dr. Stoliczka (Jour. Asiatic Soc., xl, 159) remarks upon the family as follows:

"Dohrn in 1866 (Mal. Blätter, xiii, 129), proposed to unite Streptaxis, Ennea and Streptostele into a separate group, for which he suggested the name Streptocionidæ. There does not appear to be any reason why we should deviate from the generally introduced custom of selecting the family name from that generic one which includes the most typical forms of the group, and this genus is in the present case Streptaxis. The family has already been pointed out by Dr. J. E. Gray, in 1860 (Ann. and Mag. N. H., vi, 268), under the name Streptaxidæ.

"The three above-noticed genera (each of which includes several characteristic sections) have the following characters in common: a thin hyaline or a thicker alabastrine shell with very thin, deciduous epidermis, an expanded lip of the aperture, producing in the course of growth a transverse costulation of the whorls, the last of which usually somewhat deviates from the axis of the spire; the columella is always thickened and often toothed, or provided with a projecting lamella.

"Dohrn appropriately pointed out the striking relations of the shells of the three genera by quoting the following parallelism:

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'Streptaxis is helicoid, Ennea pupoid, and Streptostele achatinoid.'

"The same author does not describe the animal of Streptostele and its anatomy, probably because they are very similar to those of Streptaxis and Ennea. I have examined several species of the latter two genera, and they all agree in the usual bright, yellow or red coloring, extending over the greater part of the body, or being restricted to the head; the anterior part of the body is always long, extensible, and the posterior short; the peduncles are long, subcylindrical, but the (inferior) tentacles much shorter, exactly as in the Helicidæ. The mantle is thickened, generally with a short lobe, or a thickening on each side of the pulmonary orifice. The internal organization closely corresponds with that of the Helicidæ, except that the œsophagus is below produced in a tough cylindrical tube, which contains the radula in the form of a narrowly curved sheath; the tube is attached by a special strong muscle to the retractor of the body. The teeth of the radula are very simple, subconical, pointed, from 40–60 in each transverse row. A special jaw is, as far as observations have been made, not developed.

"All the species which I have observed were found under stones, or trees, and old wood, or under dead leaves and other organic substances. Whether or not the species are carnivorous, as stated by Gray, I have not been able to verify. They are oviparous, like the Bulimi.

"Considering the form of the teeth, the Streptaxidæ are closely allied to the Testacellidæ, next to which they are also classed by Gray. Both families agree in the great length of the anterior part of the body and in the more or less secluded habitat. But upon inspection of the anatomy of Testacella, as given by Cuvier, I fail to notice the peculiarity of the long cylindrical tube containing the radula."

*Synopsis of Genera.*

### Genus STREPTAXIS, Gray, 1837.

Shell oval, heliciform, but often oblique, profoundly umbilicated, ridged, striate above, smooth below; last whorls usually deviating more or less from the original axis; aperture lunar, with or without teeth; lip slightly thickened and reflected.

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The principal conchological character of the group is the singular torsion of the axis of revolution, causing some of the whorls to revolve obliquely to the others.

The animal has a very long neck and short tail; the superior tentacles are narrow and long; the labial palpi narrow, as long as the inferior tentacles; genital orifice on the right side, distant from the superior tentacle, and closer to the respiratory orifice. Dentition similar to Glandina; central tooth simple.

There are about 75 species; they inhabit warm countries of South America, Africa and Asia, but are absent from Australia and the Polynesian Islands.

The sections or subgenera of Streptaxis as admitted by Pfeiffer are described in the "Structural and Systematic Conchology," iii, 16; they are rather indefinite groups on account of some species possessing characters intermediate between those upon which they are founded. Mr. C. F. Ancey (Le Naturaliste, vi, 508, 1884) remarks that:

"Pfeiffer and Clessin classify the known species of Streptaxis in these various groups:

"1st. Artemon, Pfr. (type, *S. candidus*); 2d. Scolodonta, Doering (type, *S. Semperi*); 3d. Ammonoceras, Pfr. (type, *S. ammoniformis*); 4th. Eustreptaxis, Pfr., divided itself into two groups, the one comprehending the toothless species, the other those which are provided with a parietal tooth—this section is the more numerous; 5th. Odontartemon, Pfr. (type, *S. dejectus*); 6th. Discartemon, Pfr. (type, *S. discus*).

"It seems to me quite unjust to make in Streptaxis a simple subgeneric group of Ammonoceras, in which the shells are of so different an aspect and hyaline.

"As to Scolodonta, placed by the author of the group amongst the Helices, I have no opinion, since the species are still too poorly known.

"The two sections established by these authors in Eustreptaxis or true Streptaxis, seem to me very artificial; they separate thus species having the closest analogies.

"We can, still further, speak in the same way of Odontartemon; all the toothed species are placed without order in this section. It seems to me, nevertheless, that it should be preserved,

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but only as a subdivison of Eustreptaxis, the principal character on which it is founded not being that which, to my sense, is sufficient for the creation of a section, since among the toothed species are some with three denticulations, and others with more. We should take as types of the group: *S. dejectus*, *S. Deplanchei*, *S. Watsoni* and allied species, and exclude a certain number, among which are *S. Troberti*, Petit, from Guinea, and *S. bulbulus*, which can constitute, I think, good sections in the genus.

"For the reception of *Streptaxis Troberti*, on account of the characters which follow, I establish a new section, to which I give the name of Lamelliger, distinguished in fact from Odontartemon by the following peculiarities:

"The aperture, on its parietal wall, not having in its middle part a tubercular tooth as the great part of Odontartemon, but a strong reflexed lamella, which is prolonged very far into its interior. The free parietal teeth of this species are two in number, small, and in the case of one almost obsolete. They are situated at the base, near the columellar axis. The form of the shell is depressed, and presents the same characters as that of the typical species of Odontartemon.

"The *Ennea bulbulus*, Mor., and *E. Michaui*, Cr. and Fischer, which Pfeiffer classed with doubt among the Streptaxis, constitute a natural passage to Ennea. These species, concerning the generic position of which there will probably yet for a long time be discussion, but which seem to me for the most part to be Enneas, shortened, globose ovoid, and a little Streptaxiform, caused by the inclination of the axis of the shell, which is, however, more regular than that of many Streptaxis, should, and this for the very uncertainty of their position, form a new group, restricted so far to the island of Puolo-Condor. Besides the peculiar form of the shell, this group, which has the shell of the same nature as that of the true Enneas, finely striate, a spire with quite numerous whorls, not very rapidly increasing, presents a quite peculiar appearance, and the two species, of which one is toothless, the other possessing on the peristome irregularly disposed teeth, have between them an air of relationship, by which they may be recognized. I will give to this group, on account of the form of its spire, the name of Oophana."

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Mr. John W. Taylor has recently separated a new group under the name of Gonaxis; he thus characterizes it:

"Shell pupiform, unsymmetrical, axis of the apical whorls directed to the right, lower aspect of penultimate whorl of a somewhat triangular shape, forming a prominent hump on the left side.

"The most important character of this genus is the deflection of the upper or apical whorls, whereas in Streptaxis it is the last whorl only that is diverted from the perpendicular. This peculiarity appears to me to be of sufficient importance to warrant the erection of this genus."

The type of Mr. Taylor's new genus is represented on Plate 14, figs. 82, 83. The apparent peculiarity to which he alludes is shared more or less by several other species of elongated Streptaxis, and the recognition of the group as valid can scarcely serve a useful purpose.

Speaking of the Indian species, Mr. W. T. Blanford writes: "All the species of Streptaxis are somewhat variable, and with a large collection from South India it would probably be found that many intermediate varieties occur. As a rule, the general form appears more constant than any other characters, and the teeth in the mouth vary considerably. The parietal lamellæ are peculiarly inconstant."

Eustreptaxis is undoubtedly the typical group of the genus, whilst Artemon, Scolodonta, etc., possessing depressed helicoid shells, regular in volutions, are aberrant forms, not readily distinguished, conchologically, from certain species of true Helices; yet for the purpose of preserving the transition from Streptaxis to Ennea, I am forced to commence this monograph with these aberrant instead of typical groups. As the deflection of the whorls is really an adult character, it follows that in young shells the volutions are regular; a fact which is very apt to mislead an inexperienced conchologist; Artemon may be regarded as an arrested development of Streptaxis, the shell becoming adult with the persistence of juvenile characters.

Section ARTEMON, Pfeiffer. Shell heliciform, rather flattened, whorls regular, aperture without teeth, outer lip often slightly thickened and expanded or subreflected. *South American.*

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Subsection AMMONOCERAS, Pfeiffer. Shell depressed, orbicular, shining, pellucid, thin, radiately striate; umbilicus wide, perspective; spire rather flattened; last whorl not descending at the aperture, the periphery rounded; aperture large, rounded lunate; lip simple, acute, its extremities approaching.

With this group may be united Scolodonta, Döring.

Section DISCARTEMON, Pfeiffer. Shell discoidal or depressed conoidal, volutions regular; openly umbilicated; aperture transverse, somewhat basal, outer lip reflected or expanded, thickened, and together with the parietal wall, usually armed with teeth. *South America.*

Section EUSTREPTAXIS, Pfr. Axis of the shell oblique, causing some whorls to revolve obliquely to the others.

Subsection 1. Edentulæ.

Subsection 2. Dente parietali munitæ.

Subsection 3. Pariete aperturali et peristomate armatis (Odontartemon, Pfr.).

The prolonged lamella of the parietal wall in *S. Troberti* is thought, by Mr. Ancey, sufficiently distinctive for the formation of a new section, Lamelliger; but in some of the other species there are intermediates between this kind of tooth and the more usual short tubercle, so that if the group were adopted it would be difficult to assign all the species. At first I was disposed to regard the claim of Oophana to recognition as a distinct group as more valid, but a comparison on my plates of the typical forms of *L. bulbulus* and *S. Michaui* with *S. turbinatus*, *S. Mozambicensis*, *S. decipiens*, *S. obtusus*, *S. Enneoides*, *S. Welwitschi*, etc., shows that the former only form a part of a continuous series by which the usually prostrate Asiatic species are connected with Ennea.

## Genus OMPHALOPTYX, Böttger, 1875.

Fossil only. See "Structural and Syst. Conchology," iii, 16.

## Genus GIBBUS, Montfort, 1810.

Animal like Streptaxis; the teeth are arranged in very oblique rows, the central tooth elongated, subirregular, simple, unicuspid.

Shell rimate or perforated, pupiform, oblique, with obtuse

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summit, whorls numerous, flattened, pale corneous or whitish, usually ribbed-striate; aperture oblong or subtetragonal, with or without teeth, lip with reflected margin, the extremities united by a callus, columella almost straight, unarmed.

I have adopted for Gibbus, the extended limits assigned it by Dr. Paul Fischer, including Ennea as a subgenus. Whilst there are great differences as to size, and some in form, between species of Gibbulina, and the usual manifestation of Ennea, still there exist some intermediate species; and the differences between these two typical groups are certainly no greater than those of the two principal sections of Streptaxis. Montfort's name, being the oldest, is adopted for the entire group, instead of the restricted use of it by its author, followed by Albers and Pfeiffer, for the aberrant form which is its type.

The geographical distribution of Gibbus is much more restricted than that of Streptaxis, being confined (except for a single introduced species) to the old world. The larger and more typical groups occur in Mauritius, the Isle of Bourbon, Madagascar and the Seychelles Islands; being entirely insular: Ennea, on the contrary, is essentially (but not entirely) continental, being largely tropical African and Asiatic. Together, fully one hundred species have been described.

Section GIBBUS, Montf., 1810. Shell subconical, whorls flattened on the front and back. *G. Lyonetianus.*

? Section PASSAMAELLA, Pfeiffer, 1877. Subconical, obliquely regularly striate, last whorl dilated below at the base of the aperture, widely umbilicated; aperture coarctate, ringent, dentate. *G. Passamainus*, Petit. *Island of Socotra.* The position of this species is extremely problematical: it may belong to the Pupæ.

Section GONIODOMUS, Swainson, 1840. Shell ovate, whorls ventricose, obliquely costulate, aperture directed obliquely outwards at its base. *G. pagoda*, Fér.

There is a slight displacement of the whorls in this single species (to which the group is restricted), which appears to connect Gibbus with the following group.

Section PLICADOMUS, Swainson, 1840. Shell ovately subconic, apex obtuse, whorls regular, surface obliquely costulate. *G. sulcatus*, Müll.

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Section EDENTULINA, Pfeiffer, 1855. Conical ovate, with tapering spire and blunt apex, smooth, suture thread-margined, aperture unarmed, the lip thickened and expanded-reflected. *G. ovoideus*, Brug.

Section GONOSPIRA, Swainson, 1840. Subcylindrical, with obtuse or pupiform apex; parietal wall of aperture unarmed or with a short lamelliform tooth. *G. palanga*, Fér.

Subgenus ENNEA, H. and A. Adams, 1855.

Shell small, pupiform, with obtuse apex; aperture with reflected lip, usually armed with teeth, parietal wall generally dentate or lamellate.

Section UNIPLICARIA, Pfeiffer, 1855. Shell rather large for the subgenus, shining, obsoletely striate, lip without teeth, parietal wall with a strong lamella near the junction of the upper extremity of the outer lip. *E. cerea*, Dunker.

Mostly *Africa* and *Madagascar*.

Section NEVILLIA, Martens, 1880. Shell small, ventricosely pupiform, with numerous narrow whorls; longitudinally closely, sharply ribbed, aperture somewhat produced, small, with expanded lip, parietal wall nearly horizontal, bearing a prominent lamella. *G. clavulata*, Lam. Approaches Ennea.

Section ENNEASTRUM, Pfeiffer, 1855. Parietal and outer margins of the aperture both lamellate. *E. elegantula*, Morelet. *Africa*.

Section GULELLA, Pfeiffer, 1855. Smooth, or obliquely finely ribbed-striate; parietal margin lamellate, outer lip multidentate. *E. capitata*, Gould. *Africa*.

Section HUTTONELLA, Pfeiffer, 1855. Elongated, narrowly cylindrical, minute, hyaline, polished; parietal wall plicate, interior of aperture dentate. *Africa*, *India*. *E. bicolor*, Hutton, an Indian species, has been introduced into China, the Mascarene Islands, West Indies, etc.

Subgenus DIAPHORA, Albers, 1850.

Cylindrical, umbilicated, apex obtuse, base obsoletely carinate; whorls numerous, narrow, flattened, the last detached; aperture pyriform, not dentate, the lip expanded. *G. Cumingianus*, Pfeiffer.

Resembles Cylindrella. *Indo-China*, *Philippines*.

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## Genus STREPTOSTELE, 1866.

Animal brightly red or yellow-colored, as in Streptaxis; central tooth of the radula narrow and very long.

Shell achatinoid, hyaline, subvaricose; pillar lip twisted and thickened, outer lip expanded, reflected. *S. lotophaga*, Mor.

*Prince's Isl., Seychelles, Formosa.*

Section ELMA, H. Adams, 1866. Outer lip more or less sinuous above, aperture without teeth, surface smoothish, shining. *S. Swinhoei*, H. Adams.

Section PTYCHOTREMA, Mörch, 1852. Surface obliquely closely ribbed-striate, aperture lamellarly toothed within, with corresponding exterior constrictions or troughs. *S. cyathostoma*, Pfr.

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## Genus STREPTAXIS, Gray.

### Section ARTEMON, Pfeiffer.

S. CANDIDUS, Spix. Pl. 12, figs. 1–3.

Whorls 6–7, slowly increasing, the last not descending at the aperture, ribbed striate above, smooth beneath; margin of aperture shortly reflected; yellowish white to light-yellowish brown. Diam., 34 mill.

*Brazil.*

There is a variety faintly or obsoletely sculptured. The synonyms are *H. Spixiana*, Pfr., and *H. perspectiva*, Wagner.

S. INTERMEDIUS, Albers. Pl. 12, figs. 4–6.

More depressed, with much wider umbilicus than the preceding species, whorls $7\frac{3}{4}$, subangulate at the periphery; margin of the aperture not thickened, reflected only at the base; whitish, waxy, shining. Diam., 34 mill.

*Brazil.*

S. GIGAS, E. A. Smith. Pl. 16, figs. 8, 9.

Depressed globose, with elevated spire, and moderate umbilicus; whorls 6, arcuately striate above, with traces of revolving lines, smooth beneath; lip simple. Diam., 33 mill.

Between *Lake Nyassa* and the *East Coast of Africa.*

The two specimens obtained were not adult.

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S. REGIUS, Lobbecke. Pl. 16, figs. 10, 11.

Shell subglobosely, conoidal, widely and perspectively umbilicated; whorls 7½, regularly increasing, very finely filiformly costulate; lip not reflected; white. Diam., 31 mill.

*Brazil?*

Found in an old collection, of which it formed a part for about a century at least.

S. WAGNERI, Pfeiffer. Pl. 12, figs. 9–11.

Widely umbilicated, depressed; whorls 6, closely costulate above, smooth beneath, subangulate at the periphery; yellowish white or waxy white, shining; lip white, shortly reflected. Diam., 20 mill.

*Brazil.*

It is *S. Coffreanus*, Moricand, and perhaps *Artemon planulatus*, Beck.

S. ROLLANDI, Bernardi. Pl. 12, figs. 12, 13.

Shell profoundly umbilicated, rather flattened and rugosely, malleately plicate above, convexly inflated and regularly plicate below; whorls 7, the last obsoletely tricarinate, the first near the suture, the second on the upper part of the whorl, the third around the wide, perspective umbilicus; peristome not reflected; whitish. Diam., 20 mill.

*Brazil?*

S. PAIVANUS, Pfeiffer. Pl. 12, figs. 7, 8.

Convexly conical, rather thin, shining, pellucid; whorls 7½, slowly increasing, suture thread-margined, lightly striulate above, smooth below, marked by several variciform striæ; hyaline white; umbilicus narrow; margin of aperture shortly reflected. Diam., 6·5 mill.

*Brazil.*

S. CONOIDEUS, Pfeiffer. Pl. 12, figs. 19, 20.

Somewhat regularly conoidal, moderately solid; whorls 7, here and there varicose, ribbed striate above, smooth below, the periphery angulated; narrowly umbilicated; peristome narrowly reflected; greenish white. Diam., 18 mill.

*Venezuela* (Ernst).

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S. COSTULOSUS, Pfeiffer. Pl. 12, figs. 30–32.

Conoidal, obliquely finely costulate, distantly subvaricose; whorls 6½, the last with angulated periphery, somewhat flattened base, and narrow umbilicus; whitish under a yellowish epidermis.
Diam., 17·5 mill.

*Solomon's Islands.*

S. CYPSELE, Pfeiffer. Pl. 16, figs. 98, 99.

Shell elevated conoidal, whorls 9, subcostulate, slowly increasing; umbilicus wide and deep; aperture very small.
Diam., 20 mill.

*Habitat unknown.*

Much resembles in form the Helices of the genus Sagda, inhabiting Jamaica.

S. APERTUS, Martens.

Conoidally globose, widely umbilicated, ribbed-striate; whorls 6½ to 7½, slowly increasing; white; aperture small, slightly oblique, the peristome narrowly reflected.
Diam. 21, alt. 14 mill.

*Brazil.*

Var. DEPRESSUS, Martens. Diam. 18·5, alt. 10 mill.

An unfigured species.

Subsection AMMONOCERAS, Pfeiffer.

S. CHALCOPHILA, Orb. Pl. 12, fig. 21.

Shell largely perspectively umbilicated, orbicularly depressed, smooth, thin, finely striated, diaphanous, grayish horny; spire obtuse; whorls 6, slantingly convex; aperture obliquely lunar, lip simple. Diam., 16 mill.

*Bolivia.*

S. SKIAPHILA, Orb. Pl. 12, fig. 22.

Thin, nearly smooth, diaphanous; white; whorls 6; lip thin.
Diam., 12 mill.

*Cochabamba, Bolivia.*

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S. HYLEPHILA, Orb. Pl. 12, figs. 33, 28.

Thin, diaphanous, striated, smooth below; white; whorls 6; lip thickened. Diam., 8 mill.

*Bolivia.*

*S. ochthephila*, Orb. (fig. 28), is a minor variety; diam., 6 mill.

S. BOUNOBOENA, Orb. Pl. 12, fig. 34.

Moderately solid, obliquely striate; whorls 5½; umbilicus narrow; lip callous within; greenish white, vitreous.

Diam., 9 mill.

*Bolivia.*

S. OMALOMORPHA, Orb. Pl. 12, fig. 14.

Thin, striulate, white under a yellowish epidermis; whorls 7; peristome simple. Diam., 19–25 mill.

*Bolivia.*

S. FLORA, Pfeiffer. Pl. 27, fig. 4.

Depressed orbicular, thin, translucent, lightly striated above, smooth below; umbilicus moderate, perspective; lip thin, sharp; greenish yellow, interior pearly white. Diam., 28 mill.

*Andes of Columbia.*

Pfeiffer places this species in Streptaxis, but its position here appears to me somewhat doubtful.

S. CUZCANA, Philippi. Pl. 13, figs. 46, 47.

Depressed; striulate above, smooth below, thin, diaphanous, shining; yellowish brown; whorls 5–6; lip thin, simple, subemarginate in the middle. Diam., 16–19 mill.

*Cuzco, Peru; Baeza, Ecuador.*

*Helix Baezensis*, Hidalgo, is a synonym.

S. VITRINA, Wagner. Pl. 13, figs. 38–40.

Subdiscoidal, striulate, pellucid, very shining, yellowish corneous; spire plane, subexcavated; whorls 4, the last wide; peristome simple. Diam., 15·5 mill.

*Southern Brazil.*

This species bears the names of *Helix circumplexa*, Fér., *H. valvæformis*, Nyst, and *Solarium imperforatum*, Spix; the young shell is *Helix nana*, Wagner, and *Solarium pygmæum*, Spix.

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S. THOMASI, Pfr. Pl. 13, fig. 48.

Thin, striulate, somewhat shining; umbilicus moderate, perspective; lip simple; yellowish white. Diam., 7·5 mill.

*Marmato, N. Granada.*

S. TROCHILIONEIDES, Orb. Pl. 13, figs. 49–51; Pl. 27, figs. 5–7.

Shell thinly striulate, shining, diaphanous, white; whorls 6, somewhat flattened; umbilicus moderate; aperture subvertical, the lip simple, its extremities approaching. Length, 4·5 mill.

*Bolivia.*

*H. spirillus*, Gould (figs. 5–7), from Lima, Peru, is a synonym.

S. AMMONOCERAS, Pfeiffer. Pl. 13, fig. 52.

Much depressed, arcuately striate, thin, pellucid, shining; light corneous; spire minute, subimmersed, suture profound; whorls about 4, rapidly increasing, the last laterally flattened, with obsoletely angulated periphery; aperture wide, oblique, lip simple; umbilicus wide. Diam., 4·5 mill.

*Santa Ana, N. Granada;* also island of *Grenada, W. I.* (Bland).

S. MOYOBAMBENSIS, Moricand. Pl. 13, figs. 55, 56.

Shell depressed, rather solid, closely rugosely striated, with a few impressed concentric lines; whorls 4–4½, the last inflated, with well-impressed suture; aperture large, subcircular, pearly, the lip simple; olive corneous. Diam., 31 mill.

*Moyobamba, Peru.*

S. ORBICULA, Orb. Pl. 13, figs. 35–37.

Broadly umbilicated, nearly discoid, finely striated, diaphanous, shining, grayish yellow; whorls 7–8; umbilicus broad; lip simple, sharp. Diam., 10 mill.

*Bolivia.*

S. AMMONIFORMIS, Orb. Pl. 13, figs. 43–45. Magn. ⅔.

Widely umbilicated, orbicularly concave, depressed, thin, diaphanous, grayish white, nearly smooth; whorls 5, the last obliquely dilated; lip simple, sharp, recurved above.

Diam., 14 mill.

*Bolivia.*



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S. ARGENTINA, Strobel. Pl. 13, figs. 58–60. Magn. $\frac{3}{1}$.

Widely umbilicated, orbicularly depressed, almost discoidal, diaphanous, shining, whitish, fragile; whorls 5, flattened, thinly striated, slowly increasing, suture deep; lip expanded.

Diam. 6 mill.

*Mendoza* and *Bahia Blanca, Argentine Republic.*

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*Unfigured and Undetermined Species of the Ammonoceras group.*

S. SEMPERI, Döring. *Argentine Republic.*

S. SPIRORBIS, Deshayes. Near *Rio Janeiro, Brazil.*

S. NITIDULUS and S. AMAZONICUS, Dohrn. *Province of Para, Brazil.*

S. MUTATA, Gould. *Brazil.*

Gould remarks in his "Otia," that this may = *insignis*, Orb., which also resembles a Streptaxis. The species is not included in the "Mollusca of the Wilkes Expedition."

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S. PROBLEMATICA, Pfr. Pl. 12, fig. 15. *India.*

S. BOMBAX, Benson. Pl. 12, figs. 26, 27. *India.*

These two species are both probably juvenile shells of Eustreptaxis.

Section DISCARTEMON, Pfeiffer.

S. DISCUS, Pfeiffer. Pl. 16, figs. 77–79.

Smooth, irregularly varicose; whorls $6\frac{1}{2}$, flattened above, with a slightly prominent apex; the last whorl deflected near the aperture; aperture subhorizontal, transversely auriform, with an oblique parietal plica; lip reflected, the upper margin impressed and obsoletely dentate, the outer margin with a stronger tooth, the base transversely callous; hyaline white. Diam., 14 mill.

*Hab. unknown.*

S. CRYPTODON, Moricand. Pl. 16, figs. 87–89.

Smoothish and somewhat solid, pellucid, greenish white; whorls 5; umbilicus moderate, cylindrical; aperture scarcely oblique, depressed lunar, tridentate, one conical parietal tooth, and two obtuse ones on the basal margin, peristome somewhat callously thickened, simple. Diam., 5·5 mill.

*Brazil.*

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S. Crossei, Pfeiffer. Pl. 16, figs. 3, 4.

Somewhat solid, closely ribbed-striate above, smooth below; whorls 7, the last deflected in front; aperture oblique, transversely auriform, with a parietal lamina, a central small tooth within the outer lip, and a bituberculate transverse tooth at its base; waxy, hyaline. Diam., 8·5 mill.

Near *Rio Janeiro*, *Brazil*.

S. Lemyrei, Morelet. Pl. 16, figs. 12, 13.

Whorls 5, regularly striate; subtranslucent, moderately solid; aperture oblique, subquadrately rounded, peristome reflected, at the base partly covering the narrow umbilicus, within are two lamellæ, one of them hardly visible externally, the other parietal, linguiform, short. Diam., 11 mill.

*Cumbodia*.

Section Eustreptaxis, Pfeiffer, 1877.

Subsection I. *Edentulæ*.

S. nobilis, Gray. Pl. 13, figs. 53, 54, 61, 64, 68, 41, 42.

Turbinate, moderately thick, umbilicus rimate; whorls 5½, closely striated above, smooth beneath, shining; very light olivaceous or yellowish white, with irregular greenish strigations on the spire; lip expanded-reflected. Diam., 1 inch.

*Liberia*, *Sierra Leone*.

The synonyms include ? *Helix pagoda*, Fér.; *H. Monroviana*, Rang (juvenile); *H. Blandingiana*, Lea; *St. rimata*, Pfr. (fig. 68); *St. Recluziana*, Petit (figs. 41, 42); the latter a small variety.

S. Craveni, E. A. Smith. Pl. 16, figs. 6, 7.

Narrowly umbilicated, obliquely distorted, smooth, glossy, dirty milky-white; whorls 7, closely costulately striated at the suture, the last whorl suddenly descending in front, then rising somewhat upon the preceding whorl, very obliquely deviating; outer lip a little thickened and reflected, sinuated at the suture. Diam. 22 mill., alt. 29 mill.

*On hills between the mouth of the river Dana and Mombasa*, *East Africa* (Kirk).

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S. SUTURALIS, Martens. Pl. 12, fig. 23.

Shell perforate, globosely conical, thin, white; whorls 7½, obliquely costulately striate, the last smooth below; suture planulate and costulate; lip white, widely reflected below, flexuous above. Diam., 28 mill.

*New Granada.*

S. DUNKERI, Pfr. Pl. 13, figs. 57, 62, 63, 65–67; Pl. 14, figs. 69–72.

Shell rimate, light yellowish horn-color; whorls 8, elegantly costulately striate above, decussated by minute spiral lines, base smooth, shining, excavated, with remote radiating impressed lines, excavated around the umbilicus; lip white, reflected. Diam., 29 mill.

*Brazil; New Granada.*

The synonyms include var. *clausa*, Löbbecke (figs. 65–67), which equals *S. Funcki*, Pfr. (Pl. 14, figs. 69–72), from New Granada; they are distinguished by the umbilicus being nearly or entirely closed. The specimens before me clearly indicate the specific identity of these forms.

S. SUBREGULARIS, Pfr. Pl. 12, figs. 16–18.

Turbinately semiglobose, narrowly umbilicated, whorls 7, closely obliquely costulate above, obsoletely decussated by revolving lines, smooth beneath; hyaline white; margin of aperture narrowly reflected. Diam., 21 mill.

*Brazil.*

S. CONTUSUS, Fér. Pl. 14, figs. 76–78.

Shell minutely perforate, yellowish corneous, whorls 7–8, costulately striated and minutely decussated above, smooth below; lip white, shortly reflected. Diam., 21 mill.

*Brazil.*

S. UBERIFORMIS, Pfr. Pl. 14, fig. 94.

Profoundly rimately perforate, rather thin, diaphanous, light greenish corneous; whorls 6½, closely costulately striate above, decussated by very light striæ, base subplanulate, smooth; lip shortly expanded-reflected. Diam., 18 mill.

*Brazil.*

Hidalgo (Viaje Pacif., 41) considers this a variety of the preceding species. They are certainly very closely allied, but the

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present form has a higher, more conical spire and is less oblique, and with more flattened base.

S. ALVEUS, Dunker. Pl. 27, fig. 11; Pl. 12, fig. 29.

Shell perforate, regularly obliquely finely costulate above, planate and smooth beneath; whorls 10, flattened, the last obtusely angulated at the periphery; corneous white; lip expanded, narrowly reflected below. Diam., 10 mill.

*Brazil.*

*Helix contermina*, Reeve (fig. 29), is a synonym.

S. DESHAYESIANUS, Crosse. Pl. 14, fig. 97.

Narrowly umbilicated, corneous white; whorls 6½, with impressed striæ above, the base planulate, inconspicuously striate, somewhat shining; lip white, reflected, subflexuous and thinner above. Diam., 5 mill.

*Brazil.*

S. TURBINATUS, Morelet. Pl. 12, figs. 24, 25.

Perforate, thin, corneous white; whorls 6, convex, suture profound, regularly costulate, base planulate; lip regularly expanded, shortly arcuate above. Diam., 10 mill.

At *Lake Quilonda, Angola, W. Africa.*

S. DEPLANATUS, Pfr. Pl. 14, figs. 84–86.

Rimately subperforate, thin, diaphanous, yellowish; whorls 6½, closely costulately striate above; base somewhat flattened, smooth, shining; lip white, narrowly expanded, reflected. Diam., 11·3 mill.

*Habitat unknown.*

S. WELWITSCHI, Morelet. Pl. 14, figs. 73–75.

Concavely rimate, thin, smoothish, plicately striated at the sutures, shining, semidiaphanous, light yellowish; whorls 5½, suture deep, base of shell planulate, smooth; lip white, thin, expanded. Diam., 13 mill.

*Cazengo, Angola, W. Africa.*

S. PROSTRATUS, Gould. Pl. 27, fig. 9.

Perforate, rather thin, hyaline white; whorls 5½, lightly arcuately striate above, smooth below, the last whorl subangulate at the periphery in front; parietal wall edentulous or with a minute tooth; lip slightly reflected. Diam., 10 mill.

*Cape Palmas, W. Africa.*

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S. ALBIDUS, Pfeiffer. Pl. 14, figs. 79–81.

Subperforate, smooth, white; whorls 5; aperture edentulous, the lip simple, somewhat reflected at the columella.

Diam., 8 mill.

*Guinea* (Pätel).

S. CANDEANUS, Petit. Pl. 14, figs. 89–91.

Shell white, shining, perforate; whorls 5–6; aperture edentulous, the lip narrowly reflected. Diam., 4 mill.

*New Granada.*

Dr. Pfeiffer at one time confounded this with *S. deformis*, Fér., and although the latter is larger, and the parietal wall is furnished with a small tooth, I think it very probable that they are merely forms of one species.

S. GIBBONSI, Taylor. Pl. 14, figs. 82, 83.

Shell thin, shining, semitransparent, opalescent, smooth; whorls 5½, suture profound, with short prominent plicæ; lip thickened and a little everted, the extremities connected by a slight callus; umbilicus small, shallow, partly concealed by the inner lip. L. 7, diam. 4·5 mill.

*Zanzibar.*

Said to be most nearly allied to the unfigured *S. Kirki*, Dohrn. It is the type of Mr. Taylor's genus Gonaxis (see p. 57).

S. ENNEOIDES, Martens. Pl. 16, fig. 5.

Shell perforate, arcuately costulate, yellowish white, somewhat shining; whorls 6, with denticulated suture, the last one with flattened and smooth base; lip white, arcuate above, somewhat expanded. Diam. 9, alt. 13·5 mill.

*Ukamba, W. Africa.*

Martens says that this is very close to *S. Welwitschi*, Morelet, but that species is smooth except at the sutures.

S. MOZAMBICENSIS, E. A. Smith. Pl. 14, figs. 87, 88.

Shell linearly rimate, whitish, smooth, glossy; whorls 6, crenulated beneath the deep suture; outer lip narrowly expanded. Diam. 4·5, alt. 7·5 mill.

Between *Lake Nyassa* and the *East Coast of Africa.*

This species is smaller and less distorted than *S. Kirkii*, Dohrn, and has merely a linear umbilical fissure. It is likewise

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smaller than *S. Enneoides*, Martens, not perforate, smooth, and has more convex whorls.

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*Unfigured and Undetermined Species.*

S. GIBBOSUS, Pfr. *New Granada.*

S. DENTICULATUS, Dohrn. (Suture denticulate).
*Mombasa, E. Africa.*

S. KIRKII, Dohrn. *Island in Lake Nyassa.*

S. EPISTYLIUM, Müller. *Guinea* (Mörch).

This species was for a long time considered one of the group called Sagda, so characteristic of Jamaica. Mörch (Jour. de Conch., xxiv, 374) says that the type has been found, and that it is a Streptaxis. The figure in Lister is unrecognizable.

Subsection II. *Dente parietali munitæ.*

S. OVATUS, Pfeiffer. Pl. 14, figs. 92, 93.

Perforate, pellucid, greenish white; whorls 6½, closely striate above; parietal wall with a lamelliform tooth, lip white, slightly expanded. Diam., 16 mill.

*Habitat unknown.*

S. DEFLEXUS, Souleyet. Pl. 14, figs. 95, 96.

Shell narrowly umbilicated, whitish, arcuately striated above, smooth below; whorls 6, with deep suture; aperture with a lamellar parietal tooth, peristome expanded-reflected.

Diam., 18 mill.

*Touranne, Cochin China.*

S. SOLIDULUS, Stoliczka. Pl. 14, fig. 99.

Moderately umbilicated, solid, white; whorls 7, flexuosely costulate above, smoothish below, suture simple, impressed; parietal wall with a strong tooth, lip planately reflected.

Diam., 12 mill.

*Moulmein, Burmah.*

S. PELLUCENS, Pfeiffer. Pl. 14, figs. 98, 100.

Narrowly umbilicated, thin, shining, hyaline, suture impressed, submarginate; whorls 6½, arcuately ribbed-striate, becoming

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smooth on the body-whorl; parietal lamella small, compressed, lip somewhat thickened and reflected, thinner and arcuate above.

Diam., 13 mill.

*Laos Mountains, Cambodia.*

Var. $\beta$ (Pl. 14, fig. 100), is described by Morelet as "Larger, more oblique and thinner than the type."

S. MICHAUI, Crosse and Fischer. Pl. 14, figs. 7, 8.

Umbilicus impervious, shell solid, opaque, grayish white; whorls $6\frac{1}{2}$, closely arcuately ribbed-striate; parietal tooth linguiform; lip thickened, reflected, its extremities joined by a shining callus. Diam. 8, alt. 11·6 mill.

*Isl. Poulo Condor, Cochin China.*

This is one of the species of Mr. Ancey's group *Oophana*.

S. EXACUTUS, Gould. Pl. 14, figs. 11, 12.

Widely umbilicate, thin, semidiaphanous, white; whorls 6, closely lirate-striate above, last whorl smooth below; suture deep; parietal wall with a strong laminar and an inconspicuous second tooth; lip white, reflected, narrower and sinuated above.

Diam., 13 mill.

*Burmah.*

S. SANKEYI, Benson. Pl. 14, figs. 2, 3.

Obliquely umbilicated, white; whorls 7, the earlier ones subplanate, the antepenultimate rather acutely carinated at the periphery, the last two deviating, and compressed around the umbilicus; closely costulately striate; parietal wall with a prominent entering lamella; peristome expanded, reflected, narrower and sinuated above. Diam., 10 mill.

*Moulmein, Burmah.*

S. HANLEYANUS, Stoliczka. Pl. 14, figs. 9, 10.

Rather widely profoundly umbilicated, grayish white; whorls $6\frac{1}{2}$, filiformly striate above and below, base subangularly convex; first whorls flattened, antepenultimate acutely carinate, balance deflected, rounded; parietal wall with entering lamina; lip reflected, sinuated above. Diam., 7·5 mill.

*Moulmein, Burmah.*

Too close to the preceding species; from which it is said to be distinguished by its smaller size, more depressed form, larger umbilicus, and longer and more regularly rectangular aperture.

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S. SINENSIS, Gould. Pl. 15, figs. 32, 33.

Shell polished, faintly impressly striated above, greenish white; whorls 7, with profound, minutely crenulated suture; parietal wall with laminar tooth, lip flexuous, reflected; umbilicus rather large. Diam., 6–10 mill.

*Hong Kong, China.*

Möllendorff, who has described vars. *medius*, *attenuatus* and *nanus*, describes the animal as yellowish or orange with the tentacles yellow to blood-red.

S. SOULEYETIANUS, Petit. Pl. 14, figs. 4–6.

Rimately umbilicated, greenish yellow; whorls 6–7, closely costate-striate above, obsoletely decussated by spiral lines, the penultimate whorl subangulated; base smoothish shining; a lamina on the parietal wall; lip white, narrowly reflected.

Diam., 13 mill. *Seychelles Islands.*

S. COSTULATUS, Möllendorff. Pl. 15, figs. 27, 28.

Narrowly umbilicated, thin, yellowish; whorls 6½, closely arcuately costulate above, smoothish below; parietal wall with an entering plica, peristome expanded-reflected, arcuate and thinner above. Diam., 7 mill. *China.*

Closely allied in form to *S. Sinensis*, Gould, but distinguished at once by the costulate upper surface.

S. COMBOIDES, Orb. Pl. 15, figs. 34–36.

Shell perforate, smoothish, shining, yellowish; whorls 6–7, faintly striulate; parietal lamina entering, compressed; peristome white, widely expanded, reflected, arcuate and obtusely unidentate above, obsoletely thickened in the middle of the base.

Diam., 10·5 mill. *Bolivia.*

Approaches Section *Odontartemon*.

S. BOREALIS, Heude. Pl. 15, figs. 29–31.

Cylindrically narrowly umbilicated, glassy pellucid, polished; whorls 6, flattened, laterally convex, with narrow suture, obsoletely costulate-striate above; parietal lamina strong, compressed; lip white, thickened and reflected, sinuous above, with an obsolete tubercle or varix on the outer lip and another on the inner, more or less developed. Diam. 6·5, length 10 mill.

*China.*

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S. PETITI, Gould. Pl. 14, figs. 16–18.

Narrowly umbilicate, thin, pellucid, greenish white, whorls 7, closely ribbed-striate, the last smooth on the base, the penultimate subangulate; parietal lamina moderate, compressed, entering; lip widely expanded, reflected, the margins subparallel. Diam., 10 mill. Near *Tavoy*, *Burmah*.

S. GLABER, Pfeiffer. Pl. 15, figs. 24–26.

Narrowly umbilicated, thin, pellucid, greenish white, smooth; whorls 6, suture white-margined; parietal wall with a minute tooth; lip white, somewhat thickened, narrowly reflected.
Diam., 8 mill. *Demerara*.

S. DEFORMIS, Fér. Pl. 27, fig. 10.

Narrowly umbilicated, thin, shining, pellucid, smooth, shining white; whorls 6, with deep suture; parietal wall with a more or less distinct minute tooth or thickening, near the junction of the outer lip; lip slightly expanded and shortly reflected.
Diam., 7·5 mill.
*Venezuela*, *Surinam*, *Islands of Trinidad*, and *Barbadoes*, *W. I.*

This is too closely allied to the preceding species, and to the edentulate *S. Candeanus*, Pfr. The three forms may need to be united.

S. PFEIFFERI, Zelebor. Pl. 14, fig. 13.

Perforate, thinnish, white; whorls 6, with deep suture, shell arcuately costulate above, smooth below, the last whorl obsoletely angulated on the periphery; a compressed lamina on the parietal wall near the insertion of the lip; lip narrowly reflected, thinner and arcuate above. Diam., 9 mill.
*Camorta*, *Nicobar Islands*.

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*Unfigured Species.*

| | |
|---|---|
| S. FORTUNEI, Pfeiffer. | *Shanghai*, *China*. |
| S. PORRECTUS, Pfeiffer. | *Laos Mountains*, *Cambodia*. |
| S. MAUGERIÆ, Gray. | *Sierra Leone*. |
| S. SINUOSUS, Pfeiffer. | *Cochin China*. |
| S. SCHWEITZERI, Dohrn. | *Liberia*. |
| S. ERYTHROCEROS, Möllendorff. | *Southern China*. |

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Subsection III. *Pariete aperturali et peristomate armatis (Odontartemon, Pfr.).*

S. DECIPIENS, Crosse. Pl. 15, fig. 44.

Shell perforate, smooth, shining, yellowish white; whorls 6½, lightly striulate; parietal wall with a strong compressed lamina; lip white, widely expanded and reflected, arcuate, and bearing a single tooth above. Diam., 13·5 mill.

*Chili?* (Wright).

S. BURMANICUS, Blanford. Pl. 14, fig. 14.

Narrowly umbilicated, thin, corneous, whitish, finely and closely sinuately costulate; whorls 6, the last with flattened base and angulately compressed around the umbilicus; parietal tooth moderate; lip white, thin, expanded-reflected, incurved above and basally, forming internal obsoletely dentiform projections. Diam., 10 mill.

*Aracan.*

S. TROBERTI, Petit. Pl. 15, fig. 57.

Shell perforate, minutely striulate, shining, yellowish; whorls 6, the last smooth, planulate and scrobiculate on the base; parietal lamina compressed, entering, long; lip thick, white, expanded-reflected, with two basal teeth, the lower one the largest. Diam., 6 mill.

*West Africa.*

This is the type of Mr. Ancey's group *Lammelliger*.

S. ANDAMANICUS, Benson. Pl. 14, figs. 1, 15.

Shell rimately umbilicated, with oblique, curved, rib-like striæ; suture deep; whorls 6, the last becoming smooth; parietal wall with a compressed entering lamina; lip thin, acute, somewhat expanded, compressed above, forming an interior projection. Diam., 7 mill.

*Andaman Islands; Burmah.*

*S. Blanfordianus*, Theobald (fig. 15), from Burmah, is probably only a local variety, as supposed by Mr. Blanford.

S. LAYARDIANUS, Benson. Pl. 15, figs. 22, 23.

Arcuately rimate, thin, lightly striate, corneous-white, suture crenulated; whorls 6, base slightly convex, umbilicus rugosely striate; aperture triangular, with an entering parietal lamina, and triangular tubercle at the insertion of the lip; lip expanded,

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slightly reflected, profoundly sinuated above, causing an internal projection, sinuous and reflected below. Diam., 10·5 mill.

*Ceylon.*

S. OBTUSUS, Stoliczka. Pl. 15, fig. 45.

Perforate, closely arcuately costulate, costulæ obsolete on the base; whorls 7, suture impressed; parietal wall laminate; lip thickened, with a small tooth on the outer, and another larger one on the columellar margin. Diam., 10·4 mill.

*Moulmein, Province of Tenasserim, Burmah.*

S. FUCHSIANUS, Gredler. Pl. 15, figs 39, 40.

Infundibuliformly umbilicated, thin, shining, hyaline; aperture very oblique, tridentate, with a tooth each on the middle of the outer and columellar margins, and a lamina on the parietal margin, the marginal teeth indicated exteriorly by scrobiculations; lip reflected, sinuous above. Diam., 4·5 mill.

*Hunan, China.*

S. BIDENS, Möllendorff. Pl. 15, figs. 37, 38.

Openly umbilicated, thin, shining, slightly arcuately striate; greenish hyaline; whorls 6, distinctly striated at the suture; lip white, reflected, arcuate and thinner above; parietal wall with a strong laminar tooth, with a smaller one opposite on the lip. Diam., 9 mill.

*Isl. of Hainan, China.*

S. DISTORTUS, Jonas. Pl. 15, figs. 58–60.

Perforate, rather thin, diaphanous, closely arcuately striate above, suture submarginate; whorls 5½, the last smooth on the base, carinately compressed in front; parietal wall with a compressed entering lamina; lip white, reflected, with a basal tooth corresponding with an exterior scrobiculation. Diam., 10·5 mill.

*Guinea* (Jonas); *Isl. Rodriguez* (Mus. Cuming).

S. PEROTTETI, Petit. Pl. 15, figs. 68, 69.

Profoundly rimate, rather thin, lightly striated, yellowish white, spire submarginate; whorls 6½; aperture with two subparallel laminæ; lip rather thin, expanded-reflected, with three teeth, situated within the outer, basal and columellar margins respectively. Diam., 9·5 mill.

*Nilgiri Mountains, India.*

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S. ABERRATUS, Souleyet. Pl. 15, figs. 65–67.

Perforate, faintly arcuately striated, shining, pellucid, greenish white, suture submarginate; whorls 6–7, compressed around the umbilicus; aperture with a strong tongue-shaped parietal lamina, and five teeth within the reflected lip, with corresponding exterior scrobiculations. Diam., 10 mill.

*Cochin China.*

S. THEOBALDI, Benson. Pl. 16, figs. 86, 14.

Rimately perforate, thinly striate, striæ stronger at the suture and umbilicus, white, shining, suture impressed, submarginate; whorls $5\frac{1}{2}$, the last compressed around the umbilicus, triscrobiculate around the peristome; peristome reflected, arcuate above; aperture seven-toothed, three teeth on the outer wall, two on the base, two on the parietal wall. Diam., 6 mill.

*Khasia Mts., India.*

The dentition varies, as shown by fig. 14.

S. DAFLAENSIS, Godwin-Austen. Pl. 15, figs. 74–76.

Obliquely perforate, minutely striated, white, suture well-marked; whorls $6\frac{1}{2}$, the last compressed below, near the umbilicus, so as to form a fold running up to a second and shorter fold on the outer margin; peristome slightly reflected; parietal lamina strongly developed and connected with the parietal callus; there are five lip teeth, the middle one furthest within the aperture. Diam., 8 mill.

Near *Tanir Peak*, *Dafla Hills* (4000 feet), *Assam.*

Much larger, more lengthened and flatter than *S. Theobaldi*, with a greater number of whorls, and more developed parietal lamina.

S. PYRIFORMIS, Pfeiffer. Pl. 15, figs. 61–63.

Rimately perforate, thin, closely striate above, smooth below, diaphanous, yellowish; whorls $5\frac{1}{2}$, scrobiculated at the aperture; aperture with three lip teeth and a lamina on the parietal wall. Diam., 10 mill.

*Isl. of Rodriguez.*

S. WATSONI, Blanford. Pl. 15, fig. 64.

Narrowly umbilicated, corneous white, shining, arcuately striate above, obsoletely striulate below, with white lines towards the suture of the last whorl; whorls 6, with impressed

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suture; lip reflected, somewhat thickened, whitish, with three lip teeth and a pair of lamellæ on the parietal wall.

Diam., 6·5 mill.

*Nilgirri Mountains, India.*

Var. β. Peristome five-dentate, of which three are normal, with an additional small one towards the sinus of the aperture, and a minute one near the umbilicus.

S. CUMINGIANUS, Pfeiffer. Pl. 15, figs. 54–56.

Perforate, smooth, greenish white; whorls 7; peristome narrowly expanded, margins joined by a callus, with two teeth; parietal wall with an entering lamina. Diam., 6·6 mill.

*Hab. Brazil?*

S. STREPTODON, Moricand. Pl. 15, figs. 52, 53.

Perforate, lightly striate, shining, yellowish white; whorls 7½; lip white, widely reflected, bearing two teeth not attaining the margin; parietal wall with a long flexuous lamina.

Diam. 7, alt. 9 mill.

*Bahia, Brazil.*

Differs from the next species in its larger size and contorted parietal lamina.

S. DEJECTUS, Petit. Pl. 15, figs. 47–49.

Perforate, thin, striulate, shining, yellowish white; whorls 6½, the last infundibuliform around the umbilicus; parietal wall plicate; lip reflected, bidentate, the basal tooth transverse.

Diam., 7·3 mill.

*Bahia, Brazil.*

S. CINGALENSIS, Benson. Pl. 15, figs. 50, 51.

Arcuately rimately perforate, solid, obsoletely costulately striate, polished below, corneous white, suture crenulated; whorls 6; umbilicus striated, with impressed surrounding lines; lip reflected, sinuated above, bidentate; parietal wall with a strong, entering lamina. Diam., 11 mill.

*Ceylon.*

S. CANARICUS, Beddome. Pl. 15, figs. 70–72.

Narrowly umbilicated, somewhat shining, filiformly striate, yellowish; suture submarginate; whorls 5½, the penultimate one acutely carinate behind, the last one with three constrictions below the aperture, convex below, compressed around the

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umbilicus; aperture with six lip teeth and a twisted lamina on the parietal wall; lip white, rather broadly expanded, the extremities joined by a parietal callus. Diam., 8 mill.

*S. Canara, W. India.*

S. SIAMENSIS, Pfeiffer. Pl. 15, fig. 73.

Imperviously umbilicate, diaphanous, white, lightly costulately striate, suture smooth, submarginate; whorls 6½, the penultimate acutely carinate, the last smooth and shining below; peristome white, reflected, flexuous above, four-toothed; parietal wall with a tongue-shaped lamina. Diam., 11·5 mill.

*Siam.*

S. DEPLANCHEI, Drouët. Pl. 16, figs. 80–82.

Narrowly umbilicated, diaphanous, smooth, very shining, subhyaline, white; whorls 5; aperture with elongate basal and two parietal teeth—of which the lower is strongest; lip white, reflected. Diam., 5 mill.

*Ilet la Mère, near Cayenne.*

S. CONCINNUS, Blanford. Pl. 16, figs. 90–92.

Shell umbilicated, rather indistinctly striate, shining, translucent, pale yellowish white; whorls 5, the last convex, smooth and polished below, compressed around the umbilicus, especially near the mouth, with furrows corresponding with the teeth of the aperture; aperture with two parietal and five lip teeth—one on the columellar margin near the umbilicus, a second large and double near the base, one lamellar and transverse at the base, two inside the right margin, the lower being the larger and almost bifid; lip white, slightly expanded, extremities joined by a parietal callus. Diam., 6 mill.

*So. India.*

S. PRONUS, Blanford. Pl. 16, figs. 93–95.

Umbilicated, closely ribbed-striate above, polished, translucent, pale yellowish white, suture but little impressed; whorls 5½, last whorl somewhat flattened beneath, compressed around and striate within the umbilicus, scrobiculate behind the aperture; aperture with a strong re-entering parietal plait, curved within and subbifid in front, and four teeth—one columellar, one basal, and two (of which the upper is small) inside the right margin; peristome white, thickened, expanded, subcontinuous by a thick callus projecting from the parietal wall. Diam., 6·5 mill.

*India.*

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S. PERSONATUS, Blanford. Pl. 16, figs. 83–85.

Umbilicated, smooth, shining, translucent, pale yellowish white, suture impressed; whorls 5, the last convex below and compressed around the umbilicus, scrobiculated behind the mouth; aperture with a parietal lamina, and five lip teeth—of which three are on the columellar and two on the right margin; peristome thickened, almost continuous, the parietal callus being raised. Diam., 5 mill.

*Madura, India.*

The teeth vary, being sometimes smaller, or the upper columellar tooth wanting; in one case the upper tooth of the right margin is also deficient.

S. COMPRESSUS, Blanford. Pl. 16, figs. 96, 97, 100.

Rather openly but not perviously umbilicated, scarcely striated, translucent, glossy, yellowish white, suture but little impressed; whorls 4½, penultimate bluntly keeled posteriorly, the last flattened and smooth below, compressed around the umbilicus, scrobiculate behind the mouth; aperture with five teeth, of which four are in the lip, and a re-entering bifid plait on the parietal callus; peristome thickened and expanded, sinuate above. Diam., 6 mill.

*Tinnevelly, India.*

A variety has distinct but very fine close filiform raised lines on the upper surface and inside the umbilicus, and the parietal lamina is double.

S. MOUHOTI, Pfeiffer. Pl. 15, fig. 46.

Perviously umbilicated, thinnish, closely oblique ribbed-striate, whitish, suture impressed, submarginate; whorls 6½, the last becoming smooth and flattened below; aperture with an entering parietal lamina and three minute lip teeth; peristome white, narrowly reflected, slightly arcuated above.

Diam., 13 mill.

*Siam.*

S. BULBULUS, Morelet. Pl. 15, figs. 41–43.

Openly perforate, solid, arcuately costulate, somewhat shining, white; whorls 6½, the last compressed and angulated around the umbilicus; aperture with a strong parietal lamina and sometimes

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a contiguous tubercle, and three somewhat basally situated lip-teeth; peristome thickened, reflected, thinner and sinuous above.

Long. 16·5, diam. 11 mill.

*Isl. Poulo Condor, Cochin China.*

Type of Mr. Ancey's group *Oophana*.

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*Unfigured Species of the Subsection Odontartemon.*

S. CAVICOLA, Gredler. *China.*

S. LEONENSIS, Pfeiffer. *Sierra Leone.*

S. EBURNEUS, Pfeiffer. *Cochin China.*

S. FOOTEI, W. and H. Blanford. *India.*

The original description and figures of this species are not accessible to me. It is stated to be perhaps a variety of *S. Perotetti*.

S. ELISA, Gould. *Mergui Archipelago.*

S. BIDENS, Möllendorff. *China.*

S. PACHYCHILUS, Möllendorff. *China*

## Genus GIBBUS, Montfort, 1810.

### Section GIBBUS (*s. stricto*).

G. LYONETIANUS, Pallas. Pl. 21, figs. 78, 79, 80, 81.

Corneous yellow or yellowish white; parietal wall with a tooth; umbilicus profoundly rimate. Length, 30 mill.

*Isle of France.*

Gmelin called it *Trochus distortus*, and Bowdich *Pupa modiolinus*.

Var. ANTONI, Pfr. Figs. 80, 81.

Shell openly umbilicated, parietal wall of aperture toothless. *Pupa Grateloupiana*, Pfr., is a synonym.

Var. SINISTRORSUS, Nevill. Shell reversed. Rare.

Var. OBTUSUS, Pfr. Unfigured. Considered a variety only, by von Martens.



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Section PASSAMAELLA, Pfr., 1877.

G. PASSAMAIANUS, Petit. Pl. 17, figs. 29, 36, 37. Magnified.

White, moderately solid; aperture ear-shaped, the lip thin, reflected, with a single or double tooth within, and a stronger one on the columellar margin. Length, 11–12 mill.

*Socotra.*

Found on the south side of the island, on limestone rocks, at nearly 1000 ft. alt.

Section GONIODOMUS, Swains., 1840.

G. PAGODA, Fér. Pl. 21, figs. 82, 83.

Yellowish brown, often streaked with a deeper shade. Length, 33 mill.

*Mauritius.*

This is *Pupa idolum*, Menke, and *Helix concamerata*, Wood. The young shell was described by Reeve as *Helix Barclayana* (fig. 83).

Section PLICADOMUS, Swains., 1840.

G. SULCATUS, Müller. Pl. 21, fig. 84.

Brownish yellow. Length, 30 mill.

*Mauritius.*

G. MÜLLERI, Morelet.

Profoundly rimate, minutely plicate-costulate, calcareous; spire lengthened, apex obtuse, whorls 9; aperture vertical, ovately rhomboidal, the margin thin, slightly expanded. L. 30, diam. 15 mill.

*Mauritius* (subfossil).

Unfigured. Like *G. sulcatus*, but has one more whorl, longer spire, and finer sculpture.

G. NEWTONI, H. Adams. Pl. 21, fig. 85.

Profoundly arcuately rimate, obliquely finely costate; light yellowish. Length, 24 mill.

*Mauritius.*

Section EDENTULINA, Pfr., 1855.

G. OVOIDEUS, Brug. Pl. 17, fig. 18.

Nearly smooth, whitish or yellowish white. Length, 2 inches.

*Madagascar, Ins. Mayotte.*

Is *Bulimus grandis*, Desh.

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G. OBESUS, Gibbons. Pl. 17, fig. 21.

Smooth, white, semitransparent, peristome opaque white, suture linearly margined. Length, 1 inch.

*Zanzibar;* near *Lake Nyassa.*

Except in size very like the preceding species, of which it may be a dwarf variety.

G. TUMIDUS, Morelet. Pl. 17, fig. 19.

White, cretaceous, smooth, under a thin, waxy yellow epidermis, partly eroded, rimately perforate, solid, suture narrowly margined, columella obliquely plicate, lip somewhat thickened and shortly reflected. Length, 36 mill.

*Hab. unknown.*

Is possibly only a variety of *G. ovoideus.*

G. INTERMEDIUS, Morelet. Pl. 17, figs. 20, 22, 23.

Profoundly rimate, obsoletely costulate; white; suture impressed, submarginate; columella receding, plicate; lip narrowly expanded, somewhat thickened. Length, 36 mill.

*Madagascar.*

Figs. 22 and 23 represent a variety found on the island of Nossi-Bé, N. W. of Madagascar.

G. LIBERIANUS, Lea. Pl. 17, fig. 26.

Rimate, finely obliquely striate, and very finely impressly spirally striate, smooth, polished, suture submarginate; hyaline white. Length, 1 inch.

*Liberia.*

*Bulimus pupulus*, Morelet, is a synonym. The animal is grass-green.

G. INSIGNIS, Pfr. Pl. 17, fig. 16.

Shortly rimate, very thin, pellucid, decussated by very slight striæ; columella receding, dentate-plicate, lip thin, expanded. Length, 37 mill.

*Gaboon, Africa.*

G. MARTENSI, E. A. Smith. Pl. 17, fig. 17.

Like the preceding species in general form, but is perforated, somewhat heavier, columella not plicate, longitudinal striæ stronger, the spiral striæ only visible in their interstices; the

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longitudinal lines change from coarse liræ to a nearly smooth surface on the front of the body-whorl just above the aperture.

*West Africa.*

The figure was given by Dr. von Martens as representing *G. insignis*, but Mr. Smith states that it appears to be his species.

G. MINOR, Morelet. Pl. 17, fig. 24.

Deeply rimate-umbilicated, minutely closely longitudinally striate, suture narrowly margined, lip somewhat thickened, expanded-reflected; alabaster-white, translucent.

Length, 21 mill.

*Madagascar.*

G. LATUS, E. A. Smith. Pl. 17, figs. 34, 35.

Rimate, transparent white, thinnish, obliquely striated, and finely serrated beneath the suture; lip a little thickened, narrowly reflected. Length, 20 mill.

*Central Africa.*

G. CROSSEANUS, Morelet. Pl. 20, fig. 43.

Profoundly rimate, tumid, thin, densely filiformly striate, shining, subpellucid; light horn-color; columella obliquely slightly plicate, lip callous, slightly reflected; suture narrowly marginate. Length, 15 mill.

*Ins. Mayotte.*

G. VITREUS, Morelet. Pl. 17, fig. 33.

Subrimate, thin, shining, subdiaphanous, white, suture denticulated; margin of aperture slightly expanded.

Length, 11 mill. *Golungo-Alto, Angola, Africa.*

G. ARENICOLA, Morelet. Pl. 17, fig. 32.

Shortly rimate, thin, arcuately ribbed-striate, shining, light yellowish white, shortly denticulate beneath the suture, columella dilated above, outer lip thin, slightly reflected.

Length, 13 mill. *Madagascar.*

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*The following species, placed by Pfeiffer in Edentulina, appear to me to be quite as close to Gonospira.*

G. DUSSUMIERI, Reeve. Pl. 17, fig. 38.

Obliquely striulate, shining, yellowish corneous; umbilicus perforate, lip expanded. Length, 16·5 mill.

*Seychelles Islands.*

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G. ANODON, Pfr. Pl. 17, figs. 27, 28.

Profoundly rimate, distinctly obliquely striate, alabastrine; columella obliquely plicate above, margin of aperture somewhat thickened, subrepand. Length, 15–17 mill.

*Mauritius, Ins. Mayotte,*

Fig. 28 represents a chestnut-brown variety, a rather unusual color in the genus.

G. REEVEANUS, Pfr. Pl. 17, fig. 31.

Shortly rimate, rather thin, distinctly obliquely plicate-striate. shining, greenish hyaline; suture submarginate, in the last whorl closely denticulated; lip white, slightly reflected.

Length, 15 mill.

*Hab. unknown.*

Appears to be closely related to the preceding species; I am not acquainted with it.

G. STYLODON, von Martens. Pl. 17, figs. 39, 40.

Closely related to *G. Reeveanus*, Pfr., but distinguished by having a tuberculiform tooth on the columella.

Length, 12–13 mill.

*Bonjongo, W. Africa.*

Section GONOSPIRA, Swainson, 1840.

G. METABLETA, Crosse. Pl. 21, fig. 86.

Profoundly rimate, rather thin, closely obliquely costulate, bluish white, scarcely shining, margin of lip white, shortly expanded. Length, 19 mill.

*Isl. of Rodriguez.*

It is *G. Dupontianus*, Crosse, not Nevill.

G. DEALBATUS, Webb and Berthelot. Pl. 21, fig. 2.

Shortly and profoundly rimate, closely obliquely ribbed-striated; whitish; lip shortly reflected. Length, 18 mill.

*Canary Islands.*

G. FUNICULA, Val. Pl. 21, fig. 88.

Profoundly rimate, obliquely closely ribbed-striate; lip subsimple, very shortly expanded; dirty white.

Length, 12–14 mill. *Mauritius.*

According to Nevill, is a synonym of *G. versipolis*, Fér., but it appears to me to differ considerably from that species.

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G. RODRIGUEZENSIS, Crosse. Pl. 21, fig. 91.

Rimate, rather thin, subtranslucent, closely obliquely costulate-striate, milk-white, somewhat shining; lip white, hardly reflected. Length, 12·5 mill.

*Isl. Rodriguez.*

G. TURGIDULUS, Deshayes. Pl. 21, fig. 90.

Perforate, undulately thinly striate, suture well-impressed. Length, 7 mill.

*Isle of Bourbon.*

G. CHLORIS, Crosse. Pl. 21, fig. 92.

Profoundly rimate-perforate, thin, translucent, obliquely costulate, scarcely shining; livid yellowish white; lip rather thin, scarcely reflected. Length, 6 mill.

*Isl. of Rodriguez.*

Lighter colored, with more oblique aperture than the preceding species, and also differs in the lip-margin being subinflected above.

G. MORELETI, H. Adams. Pl. 21, fig. 87.

Rimate, moderately solid, obliquely closely striate; dirty white; suture submarginate; lip expanded and slightly reflected, a little constricted in the middle, columella slightly dilated above. Length, 11 mill.

*Silhouette Isl., Seychelles Archip.*

G. PALANGA, Fér. Pl. 21, figs. 89, 94.

Rimate, moderately solid, closely striate, whitish under a yellowish or light brownish epidermis; columella deeply obsoletely plicate, parietal margin often toothed; lip a little thickened, shortly expanded. Length, 1 inch.

*Mauritius.*

This is *G. fusus*, of Lamarck, Küster, etc., but not of Müller. M. Morelet speaks of a variety which has a more cylindrical spire, greater diameter, and more rounded apex; it rarely retains its epidermis.

G. NEVILLI, H. Adams. Pl. 21, fig. 93.

Rimate, obliquely sinuately ribbed; aperture with an obsolete columellar plica, and a compressed entering parietal tooth; lip shortly expanded, slightly labiate within; whitish. Length, 1 inch.

*Mauritius.*

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G. PALANGULA, Morelet. Pl. 22, fig. 5.

Narrowly rimate, closely striate, suture marginate; light yellowish; columella plicate, parietal wall also with a small plica, lip somewhat thickened. Length, 14 mill.

*Mauritius.*

This is *G. productus*, H. Adams, published two years later. The name of *palangula* was printed by Férussac on one of his plates representing a different shell, but he did not describe the species; subsequently Pfeiffer described it under the name of *G. teres*. This, it appears to me, allows Morelet's name to stand.

G. TERES, Pfeiffer. Pl. 22, fig. 12.

Shortly rimate, rather thin, obliquely plicate, diaphanous, corneous white; lip thin, slightly expanded. Length, 10 mill.

*Mauritius.*

This is, according to Morelet, the figured but not described *Helix palangula*, Fér.

G. CYLINDRELLUS, H. Adams. Pl. 22, fig. 11.

Arcuately rimate, thin, obliquely costate, dirty white; aperture with a parietal lamella, lip shortly expanded and reflected. Length, 11 mill.

*Isle of Bourbon.*

G. DESHAYESII, H. Adams. Pl. 22, fig. 10.

Profoundly rimate, thin, pellucid, shining obliquely lightly striulate, light corneous; suture narrowly margined; aperture with small parietal tooth, lip scarcely expanded, sinuous. Length, 4·5 mill.

*Isle of Bourbon.*

G. DUPONTIANUS, Nevill. Pl. 21, fig. 95.

Openly rimate; yellowish corneous; closely strongly obliquely sulcate, the ribs wide and flexuous; no parietal tooth, columella plicate, peristome widely expanded, light yellowish. Length, 14·5 mill.

*Mauritius.*

G. ADAMSIANUS, G. and H. Nevill. Pl. 21, fig. 96.

Scarcely rimate, longitudinally costulate; white; aperture with small parietal tooth, lip reflected. Length, 18 mill.

*Mauritius.*

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G. MODIOLUS, Férussac. Pl. 21, figs. 97, 1.

Profoundly rimate, rather thin, closely obliquely costulate; white; lip shortly expanded, parietal tooth small.

Length, 1 inch.

*Mauritius.*

Var. MINOR (fig. 1). Length, 18 mill.

G. MAURITIANUS, Morelet. Pl. 21, figs. 98, 3.

Profoundly rimate, thin, corneous white, more or less diaphanous, thickly flexuously costulate, suture shortly toothed; lip somewhat thickened and a little expanded, parietal wall sometimes with a minute tooth. Length, 19–22 mill.

*Mauritius.*

Var. MINOR (fig. 3). Length, 15 mill.

Closely allied to *G. modiolus*, but appears to be thinner, more finely and regularly striate, whorls a little more convex, the last one less developed, aperture more perpendicular, parietal callosity thinner, parietal tooth generally wanting. These differences should probably be considered varietal rather than specific.

G. MONDRAINI, H. Adams. Pl. 21, fig. 99.

Profoundly arcuately rimate, very obliquely flexuously costate; dirty yellowish; aperture with a parietal tooth near the lip; lip somewhat thickened, expanded and a little reflected, subsinuous in the middle. Length. 20 mill.

*Mauritius.*

G. BARCLAYI, H. Adams. Pl. 21, fig. 4.

Profoundly rimate, obliquely costulate, suture distinct, submarginate; lip almost continuous, thickened, expanded, subreflected, parietal tooth small; epidermis straw-yellow.

Length, 17 mill.

*Mauritius.*

Dr. von Martens suspects that this is identical with the next species; judging from the figures, however, there is about the usual amount of distinction between species in this group.

G. FARINOSUS, Troschel. Pl. 21, fig. 5.

Rimate, opaque, white; arcuately remotely obliquely costate; lip simple, subreflected, the margins joined by a shining callus, parietal tooth moderate. Length, 14 mill.

*Hab. unknown.*

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G. CLAVULUS, H. Adams. Pl. 21, fig. 100.

Profoundly rimate, somewhat thin, obliquely flexuously costellate, suture slightly dentate, last whorl subangulate at the periphery, subplanate at base; parietal wall with a strong lamelliform tooth, columellar stoutly callous, obsoletely dentate, lip subthickened, expanded, continuous. Length, 18 mill.

*Mauritius.*

Mr. Nevill and Dr. von Martens make this = the unfigured *G. striaticosta*, Morelet; if this be so, the latter name should be used, having two years' priority of publication.

G. VERSIPOLIS, Férussac. Pl. 21, fig. 6; Pl. 22, fig. 2.

Profoundly rimate, rather thin, closely obliquely costellate, somewhat shining, subdiaphanous; light straw-color; parietal wall sometimes dentate, lip somewhat thickened, shortly expanded. Length, 12 mill.

*Mauritius.*

Var. MINOR (fig. 2). Spire more conoidal. Length, 10 mill.

*Pupa modiolus*, Pot. et Mich., and *Bulimus trochalus*, Albers, are synonyms.

G. BOURGUIGNATI, Desh. Pl. 22, figs. 3, 6.

Profoundly rimate, suture narrow, deep, irregularly plicate-striate; yellowish gray; lip thickened within, slightly expanded, continuous, parietal tooth small, obtuse. Length, 11 mill.

*Isle of Bourbon.*

Var. INTERSECTA. Desh. Fig. 6.

Spire somewhat more elevated, with distant distinct irregular oblique costæ. Length, 11 mill.

G. CALLIFER, Morelet. Pl. 22, fig. 4.

Profoundly rimate, thin, diaphanous, corneous, obliquely flexuously costulate, the riblets bent upwards near the suture and a little sharper there; parietal wall with a small compressed tooth, lip somewhat expanded, continuous. Length, 10–12 mill.

*Mauritius.*

G. HOLOSTOMA, Morelet. Pl. 22, fig. 7.

Profoundly rimate, obliquely flexuously costulate; corneous; aperture with a compressed, elongate, parietal tooth, lip

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thickened, shortly expanded, continuous, right margin dilated above. Length, 8–9 mill.

*Mauritius.*

G. BACILLUS, Pfr. Pl. 22, fig. 9.

Profoundly, arcuately rimate, solid, somewhat obliquely striated, suture lightly dentate; alabastrine white; lip shortly expanded, strongly margined within, parietal lamella small.

Length, 13 mill.

——— *Mauritius.*

*Unfigured Species.*

G. MACROGYRUS, Mousson. *Isle of Gomera.*

Described from a single imperfect specimen, subfossil, and compared with *G. dealbatus.*

G. HELODES, G. BREVIS, G. MODIOLINUS, all of Morelet. *Mauritius.*
G. UTRICULUS, Menke. *Hab.?*

Subgenus ENNEA, H. and A. Ad., 1855.

Section UNIPLICARIA, Pfr., 1855.

E. CEREA, Dunker. Pl. 18, fig. 41.

Subrimate, moderately solid, closely obliquely lirate, slightly shining, subdiaphanous; yellowish; columella obliquely plicate, parietal wall with a linguiform lamella. Length, 16 mill.

*Zanzibar, Madagascar, Ins. Comoro.*

E. PLANTI, Pfr. Pl. 17, fig. 25.

Shortly rimate, somewhat thin, closely obliquely striate, shining, pellucid; hyaline corneous; base smooth; columella with an oblique profound plica, parietal wall with a thin lamella near the insertion of the outer lip; lip white, thin, narrowly reflected, margin thickened within. Length, 16 mill.

*Natal.*

E. PUMILIO, Gould. Pl. 18, fig. 49.

Rimate, somewhat solid, closely obliquely striate, scarcely shining; yellowish white; suture closely crenate; aperture with a parietal plica and profound columellar tooth, lip dilated-expanded, outer margin slightly arcuate. Length, 13 mill.

*Liberia.*

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E. SORGHUM, Morelet. Pl. 18, fig. 45.

Shortly rimate, thin, obliquely striate, scarcely shining, pellucid; light horn-color; suture submargined, crenulated; lip simple, slightly expanded, parietal wall with a small tooth.

Length, 5 mill. *Prince's Isle.*

E. MICRODON, Morelet. Pl. 18, fig. 44.

Shortly rimate, thin, minutely closely striate, shining, diaphanous; grayish white; suture submargined and crenulated; columella compressed, obliquely receding, parietal tooth long, obsolete, lip subthickened, and slightly reflected, white.

Length, 13 mill. *Madagascar.*

E. DOHRNI, Smith. Pl. 18, figs. 54, 55.

Rimate, scarcely striate, shortly and obsoletely plicate towards the sutures, shining, hyaline; parietal tooth small, compressed, outer margin of lip flexuous, produced within into a median angle. Length, 10 mill. *W. Africa.*

E. MONODON, Morelet. Pl. 18, figs. 62, 63.

Rimate, striulate, shining, milk-white, suture dentate; parietal plica short, compressed, outer lip simple, above produced within into a tooth, columella dilated, subexpanded. Length, 11 mill. *Gabon, W. Africa.*

Readily distinguished by its form from all other species of the group. *E. conica*, Martens, is a synonym.

E. BEDDOMEI, Blanford.

An unfigured species, having two parietal plicæ, and two or three small, depressed, deep-seated columellar teeth.

Length, 3·75 mill.

*India.*

Section NEVILLIA, Martens, 1880.

E. CLAVULATA, Lam. Pl. 18, fig. 53.

Rimate, sharply, closely, longitudinally costulate, thin, translucent; epidermis horn-color; lip simple, laterally compressed, somewhat expanded, the right margin slightly incurved in the middle; parietal lamella compressed, thin, conspicuous.

Length, 7–8 mill.

*Mauritius.*

*Helix modiolinus*, Fér., is a synonym.

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E. UVULA, Desh. Pl. 22, fig. 8.

Rimate, thinly, regularly, longitudinally costulate; epidermis yellowish gray; lip expanded, parietal tooth compressed.

Length, 6 mill.

*Isle of Bourbon.*

E. MODESTA, H. Adams. Pl. 18, fig. 60.

Profoundly perforate, rather thin, closely longitudinally costellate, shining, pellucid; hyaline corneous; aperture obliquely subquadrangular, with expanded lip, a parietal plica and incurved outer margin. Length, 5 mill.

*Mauritius.*

According to Nevill the unfigured *E. Caldwelli*, Morelet, is identical.

E. CRYPTOPHORA, Morelet. Pl. 18, fig. 80.

Perforate, closely longitudinally costellate, crystalline; aperture with a parietal and columellar plicæ, outer lip subbidentate.

Length, 2 mill.

*Comoro Isles.*

E. CRYSTALLUM, Morelet. Pl. 18, fig. 50.

Shortly rimate, thin, rather faintly striate, suture shortly denticulate, hyaline, pellucid; parietal wall toothed, columella profoundly obsoletely plicate; lip simple, thin, expanded.

Length, 7·5 mill.

*Prince's Isl., W. Africa.*

*Pupa hyalina*, Pfr., is a synonym.

E. STENOPYLIS, Benson. Pl. 18, fig. 65.

Curved rimate, closely costulate; epidermis yellowish horn-color; body-whorl compressed below, subscrobiculate; aperture subaxial, obliquely subtriangular, lip callously expanded, parietal plica large, right margin dentate within. Length, 3·5 mill.

*Darjiling, Himalayas, India.*

E. PERAKENSIS, Godwin-Austen and Nevill. Pl. 16, fig. 15.

Shell solid, profoundly openly umbilicated, greenish crystalline; strongly costulate, the riblets subinterrupted at the basal angle, becoming obsolete on the base, but again appearing upon the wall of the umbilicus; base subplanate, the umbilical region

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defined by an angle; aperture quadrangular and quadridentate. Alt. 1·6, diam. 2 mill.

*Buket Pondong cave, Perak, Malacca.*

Similar in general form to immature specimens of the preceding species; probably not adult.

E. LARVULA, Heude. Pl. 20, fig. 66.

Umbilicated, regularly ribbed, subhyaline; aperture with parietal plica, columella and outer lip each bearing a tooth, lip thickened, reflected. Length, 3·5 mill.

*China.*

E. STROPHIOIDES, Gredler. Pl. 20, figs. 70, 71.

Openly umbilicated, somewhat distantly costate; lip strongly callous, reflected, parietal plica well-developed, outer lip dentately thickened in the middle, with sometimes an inferior thickening, columella often lamelliformly produced within, half-closing the aperture, the edges of the lamella tridentate.

Length, 4·5 mill.

*China.*

E. MICROSTOMA, Möllendorff. Pl. 20, fig. 59.

Openly umbilicated, rather distantly costate, hyaline, somewhat shining, pellucid; base compressed, obtusely carinate; aperture with a parietal plica and two remotely situated tooth-like calluses situated on the columella and outer lip; lip dilated, expanded. Length, 2·75 mill.

*China.*

Is this distinct from the preceding species? *E. Kermorganti*, Ancey, an unfigured Chinese species, appears to be closely related to, if not identical with, the above.

Section ENNEASTRUM, Pfr., 1855.

E. ELEGANTULA, Pfeiffer. Pl. 18, fig. 75.

Shortly rimate, smooth, shining, hyaline, the last whorl externally sulcate, corresponding with two spiral lamellæ within the aperture; lip thickened, somewhat expanded, sinuate above, next the parietal plicæ, columella with a superior remote tubercle. Length, 6·6 mill.

*Cape Palmas, Liberia.*

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E. PUPÆFORMIS, Morelet. Pl. 19, figs. 81, 82.

Sinuously rimate, obliquely closely costellate, yellowish white; moderately solid; last whorl bicristate; corresponding with palatal lamellæ, the upper one of which reaches the lip; aperture with an entering lamella on the parietal wall near the outer lip, outer lip with a tooth-like thickening, columella with a profound bifid callus. Length, 17 mill.

*Angola.*

E. COMPLICATA, von Martens. Pl. 20, figs. 67, 68.

Subperpendicularly rimate, obliquely striate, whitish; last whorl bisulcate; aperture with widely expanded margin, with two columellar oblique plicæ, two palatal lamellæ and a strong parietal plica. Length, 11 mill.

*Bonjongo, W. Africa.*

E. COLUMELLARIS, von Martens. Pl. 19, figs. 94, 95.

Rimate, subobliquely costulate; aperture seven-plicate, palate with two lamellæ corresponding with external sulci, the parietal wall with a strong compressed plica, outer lip with a tubercle, the columella with three deep-seated teeth, of which the two upper ones are approximate. Length, 6–7 mill.

*Bonjongo, W. Africa.*

Too closely related to the next species.

E. RINGICULA, Morelet. Pl. 19, figs. 87, 88.

Sinuously rimate, rather thin, obliquely narrowly costulate; horny white; suture denticulately margined; aperture with a strong parietal lamina, a tooth on the outer lip, two palatal lamellæ corresponding with external sulcations, the upper one reaching the lip, columella tridentate, lip callous, slightly expanded, outer margin sinuous. Length, 10 mill.

*Angola.*

E. DENTICULATA, Morelet. Pl. 27, figs. 12, 13.

Arcuately rimate, smooth, shining; light corneous, the suture white-margined and minutely denticulate; last whorl biscrobiculate; aperture with a parietal and two palatal plicæ, columella callously thickened above, lip expanded, somewhat thickened, outer margin somewhat callous in the middle. Length, 7–8 mill.

*Abyssinia.*

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Var. QUINQUEPLICATA, Jickeli. Pl. 18, figs. 58, 59.

Aperture with two additional plicæ, on the columella; surface narrowly longitudinally striate.

Var. HILDEBRANDTI, Jickeli. Pl. 18, figs. 66, 67.

Shell brownish, costulately striate, columella callously thickened or subbiplicate above.

Var. HAMACENICA, Bourguignat. (Unfigured.)

Columella with a single plication, whorls 8, instead of 10, as in the type.

E. CALAMELI, Jousseaume. Pl. 19, fig. 96.

Yellowish white, opaque, distantly obliquely striate, the striæ slightly flexuous, terminating in a denticulate suture, body-whorl bisulcate; aperture seven-dentate, consisting of a strong parietal lamella, three strong columellar teeth, and three within the outer lip, the two anterior of which are prolonged into lamellæ, lip white, subsinuous, somewhat thickened and expanded. Length, 10 mill.

*Benguela.*

E. TRIGONOSTOMA, von Martens. Pl. 18, figs. 76–78.

Rimate, obliquely striate, the body-whorl bisulcate; aperture subtriangular, quadriplicate, a large compressed parietal plica, outer lip incurved in the middle, with two palatal plicæ not attaining the margin, columella with a deep-seated subvertical compressed plica. Length, 15–17 mill.

*Bonjongo, W. Africa.*

E. BATALHANA, Pfr. Pl. 18, figs. 51, 52.

Rimate, somewhat solid, closely costulate-striate, suture subdenticulate, last whorl bisulcate; alabastrine, translucent, whitish; aperture with a strong parietal plica, two palatal lamellæ, and a subdentate callus on the outer lip, corresponding with an exterior slight inflection, lip expanded, reflected.

Length, 7 mill.

*Batalha, W. Africa.*

E. CHAPERI, Jousseaume. Pl. 18, fig. 64.

Yellowish white, translucent, obliquely subundulately striate; last whorl profoundly rimate, bisulcate; aperture with a parietal plica, two palatal lamellæ and a tooth-like projection on the

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outer lip, corresponding with a slight exterior sinuosity; lip strong, thick, reflected. Length, 5·5–7·5 mill.

*Benguela.*

E. UJIJIENSIS, E. A. Smith. Pl. 18, fig. 69.

Obliquely rimate, obliquely costulate, suture dentate; last whorl bisulcate; pale horn-color; aperture with a parietal plica and two palatal lamellæ, with one or two minor ridges below them, columella with an oblique subbasal fold and a smaller dentiform plait at the upper part.

Length (apex broken off), 17 mill.

*Ujiji, Central Africa.*

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*Unfigured Species.*

E. BICRISTATA, Morelet. *Gabon, W. Africa.*

E. DOHRNI, von Martens. *Angola.*

Mr. E. A. Smith has also used this specific name.

Section GULELLA, Pfeiffer, 1855.

E. CAPITATA, Gould. Pl. 18, fig. 70.

Arcuately rimate, finely obliquely striate, whitish, scarcely shining; body-whorl compressed and scrobiculate below; lip expanded, thickened, somewhat reflected; aperture with a tall compressed parietal plica, a deep-seated laminar tooth on the columella, a small tooth near the top, and a larger, complanate one near the base of the columellar lip, two approximate ones near the base, and a smaller single one near the top of the outer lip. Length, 13 mill.

*Cape Palmas, W. Africa.*

E. WAHLBERGI, Krauss. Pl. 19, fig. 99.

Arcuately rimate, smoothish, shining, pellucid, greenish hyaline; body-whorl biscrobiculate anteriorly; aperture six-toothed, an entering, compressed parietal plica, a deep-seated columellar tooth, a short tooth at the base of the aperture, and three within the outer lip. Length, 9 mill.

*Natal, So. Africa.*

E. DELICATULA, Pfeiffer. Pl. 19, fig. 2.

Shortly rimate, rather thin, obliquely closely plicate-striate, hyaline, white, suture crenulately margined, last whorl slightly

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scrobiculate; aperture five-dentate, a flexuous lamella on the parietal wall, a profound bidentate plica on the columella, and a basal and two lip teeth on the outer lip; lip white, reflected.

Length, 5·6 mill.

*Natal, So. Africa.*

E. CAVIDENS, von Martens. Pl. 18, figs. 72–74.

Rimate, yellowish white, obliquely striate, last whorl scrobiculate; aperture 6–7 dentate, the lip widely reflected, with a large, compressed, subflexuous parietal plica, outer margin bidentate, the lower one larger, laminate, basal margin 1–2 dentate, columellar margin two-dentate, the lower one larger, transverse, entering. Length, 13–14 mill.

*Bonjongo, W. Africa.*

E. MENKEANA, Pfr. Pl. 18, fig. 79.

Sinuately rimate, rather solid, somewhat obliquely closely costulate, diaphanous, whitish, suture margined with white teeth, base of body-whorl profoundly biscrobiculate; aperture nearly closed by teeth, a blade-like tooth on the parietal wall, a second on the columella, a third at the base and two deep-seated ones on the outer lip; lip white, expanded, somewhat reflected.

Length, 11 mill.

*Natal, So. Africa.*

E. CRASSIDENS, Pfr. Pl. 19, fig. 100.

Obliquely rimate, rather strongly plicate, whitish, body-whorl profoundly scrobiculate; aperture with a short parietal lamina, two strong (sometimes confluent) teeth on the right margin, a small tooth at the base, and a larger profound one on the columella; lip white, somewhat reflected. Length, 6 mill.

*Natal, So. Africa.*

E. ALBERSI, Pfr. Pl. 19, figs. 83, 84.

Flexuously rimate, subperforate, somewhat solid, closely somewhat obliquely costulate, opaque, white, suture crenulated; body-whorl biscrobiculate; aperture with a strong linguiform parietal lamella near the insertion of the dextral margin, a second compressed lamella on the columella, a basal tooth, and two on the outer lip; lip white, expanded, somewhat reflected.

Length, 15 mill.

*Natal, So. Africa.*



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E. INFRENDENS, Martens. Pl. 19, fig. 86.

Rimate, striulate, smoothish, hyaline, shining, last whorl with a profound scrobiculation; aperture nearly closed by the teeth, one high compressed lamella at the insertion of the columella, a deep-seated, bipartite columellar plica, two small teeth at the base, and two on the outer lip, the upper one the largest; lip white, everywhere reflected. Length, 7 mill.

*Natal, So. Africa.*

E. ADAMSIANA, Pfr. Pl. 19, fig. 85.

Flexuously rimate, obliquely costulate, shining, yellowish; suture denticulate, body-whorl profoundly scrobiculate; aperture with a superior parietal lamella, a large lamella on the outer lip, two basal teeth, a profound plica, and anterior small nodule on the columella; lip white, somewhat reflected, a little sinuous above. Length, 9 mill.

*Natal, So. Africa.*

E. DUNKERI, Pfr. Pl. 19, fig. 89.

Arcuately rimate, obliquely closely costulate, alabastrine, last whorl triscrobiculate; aperture with a large parietal lamella, a triangular tubercle on the columella, and a smaller deep-seated one, with one tooth on the basal and three on the right margin, the upper one minute, lip expanded. Length, 8·3 mill.

*Natal, So. Africa.*

E. GOULDI, Pfr. Pl. 19, fig. 13.

Obliquely rimate, rather thin, closely ribbed-striate, yellowish hyaline, body-whorl scarcely scrobiculate; aperture with a parietal lamella, an obtuse tubercle on the columella, a tooth on the base, and three nearly equal ones on the right margin, lip white, callous, shortly reflected. Length, 8·5 mill.

*Port Natal, Africa.*

E. OBOVATA, Pfr. Pl. 19, fig. 4.

Shortly arcuately rimate, thin, smoothish, hyaline, suture linearly margined, last whorl scrobiculate; aperture with a profound columellar plica, a parietal lamina, a basal and two approximate marginal teeth, lip white, shortly expanded.

Length, 6 mill.

*Liberia.*

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E. LÆVIGATA, Dohrn. Pl. 19, fig. 90.

Sinuately rimate, somewhat solid, smooth, yellowish white; aperture with a parietal lamella, a profound plica on the columella, and a small tooth below it, two teeth on the right margin, the upper one being larger, and tuberculate, lip shortly reflected. Length, 8 mill.

*Lake Nyassa, Africa.*

Var. SEXDENTATA, Martens.

The right margin of the aperture with three subequal teeth, instead of two. Length, 7·5 mill.

*Zanzibar.*

E. COMORENSIS, Martens. Pl. 19, figs. 92, 93.

Subrimate, diaphanous, shining, narrowly obliquely striate, yellowish white; aperture with a strong parietal plica, a bidentate wide columellar plica, a basal tooth, and two approximating ones on the right margin; lip scarcely thickened, distinctly reflected, subpitted externally. Length, 7 mill.

*Comoro Isles.*

E. DUPUYANA, Crosse. Pl. 18, figs. 71, 42, 43.

Subrimate, rather thin, smooth, shining, diaphanous, dirty yellowish; aperture with a parietal lamina, a subhorizontal columellar plica, a minute subbasal tooth, and a central tooth on the right margin; lip white, slightly thickened, expanded, subreflected. Length, 13 mill.

*Anjouan, Comoro Isles.*

*E. quadridentata*, Martens (figs. 42, 43), is a synonym.

E. SPLENDENS, Möllendorff. Pl. 20, figs. 62, 63.

Umbilicated, faintly striulate, shining, hyaline, suture crenulated; aperture with a strong parietal lamella, and two lip teeth corresponding with external depressions. Length, 3·5 mill.

*China.*

E. LUBRICA, Morelet. Pl. 20, figs. 40, 41.

Minutely rimate, smooth, shining, hyaline; aperture with a prominent parietal plica, two columellar teeth, the upper one strongest, outer lip with a median tooth; lip callous, thick, margin shortly reflected, the right margin sinuous, scrobiculate. Length, 9 mill.

*Ins. Mayotte.*

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E. STENOSTOMA, Beddome. Pl. 18, fig. 56.

Rimate, rather thick, smoothish, sometimes obliquely striate, dull, whitish; aperture with a strong, re-entering parietal lamella, two columellar tubercles, the upper one smaller and deep-seated, two small basal teeth, and a large bifid tooth on the right margin, lip white, expanded. Length, 3·5 mill.

*Karnul, India.*

E. NATALENSIS, Craven. Pl. 20, figs. 57, 58.

Subperforate, semitransparent, pale yellowish-green, shining, indistinctly obliquely costulate, suture crenulated; parietal lamella short, curved, outer lip with a small subcentral tooth, columella with two small teeth, one near the centre, the other near the base, lip somewhat expanded and reflected. Length, 9 mill.

*Natal, So. Africa.*

E. FISCHERIANA, Morelet. Pl. 20, fig. 39.

Flexuously rimate, obsoletely costulate, light corneous, last whorl scrobiculate; aperture with a parietal lamella, a tooth on the centre of the outer lip, another at its base, and a fourth deep-seated on the columella; lip shortly expanded, sinuous.

Length, 3 mill.

*Comoro Islands.*

Sometimes the parietal lamina is accompanied by a more profound very small tooth, and an additional small tooth is occasionally found in the throat of the shell.

Section HUTTONELLA, Pfeiffer, 1855.

E. KRAUSSI, Pfr. Pl. 19, fig. 91.

Profoundly rimate, rather thin, smooth, shining, yellowish hyaline, last whorl scrobiculate; aperture with a parietal lamina, a dentiform plica on the columella, a tooth at the base, and a larger one on the outer lip, lip white, slightly reflected.

Length, 7·5 mill.

*Natal, So. Africa.*

E. CALLOSA, Morelet. Pl. 19, figs. 15, 16.

Shortly rimate, smooth, shining, hyaline, last whorl scrobiculate; aperture with parietal lamina, a columellar tooth, one on

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the right margin, and a callous thickening at the base, lip white, shortly subreflected. Length, 9 mill.

*Isle of Mayotte.*

Larger than the preceding species, and less cylindrical, aperture more triangular, and teeth differing in size.

E. PFEIFFERI, Krauss. Pl. 19, fig. 98.

Rimate, somewhat solid, closely costulately striate, alabastrine, slightly scrobiculate at the base; aperture with a parietal lamina, a columellar tooth, another at the base, and a fourth, sometimes bifid, on the right margin, lip thickened, shortly reflected. Length, 5·5 mill.

*Cape of Good Hope.*

E. LARVA, Morelet. Pl. 20, fig. 28.

Rimately perforate, very smooth, hyaline, white, base biscrobiculate; aperture with a parietal lamina, two teeth on the right lip, one at the base, and a large laminar columellar plication, lip callous, white, shortly expanded, margin sinuous.

Length, 4 mill.

*Comoro Islands.*

E. MODIOLIFORMIS, Morelet. Pl. 20, fig. 29.

Rimately perforate, diaphanous, smooth, yellowish, suture narrowly margined; aperture with a compressed parietal lamina, an obtuse, small columellar plica, a small tooth at the base, and a punctiform tooth in the middle of the right margin; lip thickened, white, shortly reflected. Length, 18 mill.

*Comoro Islands.*

E. TRIGONA, Morelet. Pl. 20, fig. 34.

Profoundly rimate, smooth, somewhat shining, light corneous, suture narrowly margined, last whorl scrobiculate; aperture with a parietal plica, a tooth on the columella, and another on the outer margin; lip thick, sinuous, shortly reflected.

Length, 6 mill.

*Comoro Islands.*

E. SPRETA, Morelet. Pl. 20, fig. 36.

Obliquely rimate, very slightly costulate-striate, scarcely shining, corneous, last whorl obsoletely scrobiculate; aperture with a compressed median parietal plica, and a tooth on the outer lip; lip somewhat thickened, constricted in the middle, sinuous. Length, 5 mill. *Comoro Islands.*

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E. COSTULATA, Morelet. Pl. 20, fig. 38.

Concavely rimate, crystalline, plicately costulate; aperture with a compressed parietal plica, a tooth near the base of the columella, and a third on the middle of the right margin.

Length, 3 mill. *Ins. Mayotte.*

E. HORDEUM, Morelet Pl. 20, fig. 54.

Rimately perforate, thin, shining, lightly costulate, whitish; aperture with a bipartite parietal lamella, approaching a tooth on the outer margin, and a scarcely conspicuous basal tooth near the columella; lip shortly expanded, slightly reflected.

Length, 5 mill. *Comoro Islands.*

E. SULCIFERA, Morelet. Pl. 20, fig. 60.

Superficially rimate, slightly plicatulate, shining, darkish horn-color, suture slightly shortly denticulate, last whorl scrobiculate; lip with parietal lamina, and a small tooth on the middle of the right margin; lip shortly expanded, constricted in the middle.

Length, 4·5 mill. *Comoro Islands.*

E. ORYZA, Morelet. Pl. 20, fig. 61.

Rimate, minutely costulate, shining, light fulvous; aperture with a parietal lamella, and a tooth on the right margin, lip callous, a little expanded, exterior margin subsinuous.

Length, 3·5 mill. *Comoro Islands.*

E. CRASSILABRIS, Craven. Pl. 20, figs. 50, 51.

Perforate, opaque, yellowish white, finely closely obliquely costulate; aperture with a prominent parietal lamina, a strong tooth on the outer margin, and a deep-seated columellar plication; lip thickened, expanded and reflected, a pit behind the labrum corresponding with the tooth within. Length, 11·5 mill.

*Leydenburg, Transvaal, So. Africa.*

E. INFANS, Craven. Pl. 20, figs. 55, 56.

Perforate, semitransparent, yellowish brown, glossy, obliquely lirate, faintly spirally striate between the liræ, suture somewhat denticulated; aperture with a large, straight parietal lamella, labrum with a strong tooth, and corresponding exterior depression; lip white, expanded, reflected. Length, 5–5·75 mill.

*Leydenburg, Transvaal, So. Africa.*

More cylindrical and differing in the dentition of the aperture from *E. crassilabris.*

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E. SESAMUM, Morelet. Pl. 20, fig. 35.

Rimate, very minutely perforate, slightly costulate-striate, corneous, last whorl lightly scrobiculate; aperture with a parietal lamina and tooth on the right margin; lip thickened, white, shortly expanded. Length, 4 mill.

*Comoro Islands.*

E. MILIUM, Godwin-Austen. Pl. 18, fig. 68.

Somewhat shining, diaphanous; aperture with a small parietal lamella, and a strong tooth on the right margin; lip thickened, a little reflected. Length, 2·5 mill.

*Assam.*

E. MICRODINA, Morelet. Pl. 20, fig. 46.

Perforate, slightly costulate, hyaline, last whorl horizontally protracted, not compressed, the base deeply scrobiculate; aperture with a parietal lamella, and columellar tooth; lip thickened, with simple margin. Length, 2·5 mill.

*Comoro Islands.*

The horizontal protraction of the last whorl, and consequently modified umbilicus, are characters which readily distinguish this little shell from those with which I have associated it.

E. BREVICULA, Morelet. Pl. 20, fig. 31.

Deeply rimate, slightly regularly striate, shining, brownish corneous, suture submarginate, base scrobiculate; aperture with a parietal lamella, and a tooth on either margin; lip white, slightly expanded, slightly contracted in the middle.

Length, 4·5 mill.

*Comoro Islands.*

E. BALFOURI, Godwin-Austen. Pl. 20, figs. 64, 65.

Excavately perforate, rather solid, regularly slightly costulate, wax-white, or dull pale umber; aperture with small parietal thickening, columellar plica, and tooth on the right margin; lip white, callous, reflected. Length, 6 mill.

*Socotra.*

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E. PIRRIEI, Pfeiffer. Pl. 19, fig. 12.

Flexuously rimate, somewhat solid and shining, diaphanous, yellowish white; upper whorls smooth, the last two with capillary striæ, occasionally varicose, base lightly scrobiculate;

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aperture with a large, somewhat doubly terminated parietal lamina, two deep-seated columellar plicæ, and a callous thickening on the middle of the right margin; lip white, expanded, callous within. Length, 10 mill.

*Koondah Mts., India.*

E. SCULPTA, Blanford. Pl. 19, fig. 3.

Deeply flexuously rimate, diaphanous, shining, yellowish, with subflexuous vertical ribs; aperture with a parietal lamella, and four deep-seated palatal ridges, and a columellar plica, scarcely visible; lip white, expanded, widely so at the base.

Length, 8·5 mill.

*Pulney Mts., Southern India.*

E. SUBCOSTULATA, Blanford. Pl. 20, fig. 30.

Arcuately rimate, finely, rather indistinctly costulate, translucent, yellowish white; aperture with a bifid parietal lamina, a deep-seated columellar plica, and four tubercular teeth, one of them columellar, two basal and one on the right margin; lip white, expanded, flexuous above. Length, 5·5 mill.

*Shevroy Hills, Southern India.*

E. MACRODON, Blanford. Pl. 19, fig. 8.

Flexuously rimate, translucent, polished, yellowish white, with fine, hair-like vertical costulations; aperture very much contracted by teeth, a strong parietal lamina, a deep-seated columellar plica, and three teeth, one columellar, one strong transverse lamelliform basal, and one on the right margin; lip white, expanded. Length, 4 mill.

*Nilgiri Hills, Southern India.*

E. EXILIS, Blanford. Pl. 19, fig. 19.

Rimate, translucent, smooth, polished; aperture with a strong bifid parietal lamina, a deep-seated columellar plica, and four tubercular teeth—one columellar, two joined together at the base, and one on the right margin; lip white, slightly expanded.

Length, 3·6 mill.

*Mysore, Southern India.*

E. BICOLOR, Hutton. Pl. 19, figs. 14, 17, 18; Pl. 20, fig. 24.

Rimate, faintly striulate, shining white, striate at the sutures; aperture with four teeth—one parietal lamina, a subconical one

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on the right margin, corresponding with an external fosset, a small basal tooth, and a deep-seated, tongue-shaped columellar plica; lip thickened, reflected. Length, 7 mill.

*India*, *Seychelles Is.*, *Burmah*, *Cochin China*, *Indian Archipelago*, *China*, *New Caledonia*, *Islands of St. Thomas*, *Grenada* and *Trinidad*, *W. I.* (introduced).

*Pupa Largillierti*, Phil., *Carychium gigas*, Fér., *E. cafæicola*, Craven (Pl. 19, figs. 17, 18), *Pupa mellita*, Gould, and *E. Ceylanica*, Pfr. (Pl. 20, fig. 24), are synonyms.

Var. ABBREVIATA, Martens. Somewhat shorter.

E. MARIEI, Morelet. Pl. 20, figs. 48, 49, 52, 53.

Rimate, smooth, shining, lightly costulate below the sutures and at the base, light corneous, translucent, suture minutely denticulate; aperture quadridentate—a parietal lamella, a nodule on the columella, a deep-seated little tooth in the throat, and a small one on the right margin; lip white, subthickened, shortly reflected. Length, 13 mill.

*Ins. Mayotte.*

*E. pusilla*, Morelet (figs. 52, 53), was founded on an individual in which the tooth on the right margin of the aperture did not develop; its author has acknowledged its identity with *E. Mariei*.

E. DIODON, Morelet. Pl. 20, fig. 32.

Shortly rimate, thin, lightly costulate-striate, light yellowish corneous; aperture with a parietal lamina and a tooth on the outer lip; lip callous, sinuous. Length, 6 mill.

*Ins. Mayotte.*

E. GLABRA, Morelet. Pl. 20, fig. 33.

Arcuately rimate, thin, shining, hyaline, thinly plicate, suture minutely denticulate; aperture tridentate—a parietal compressed lamella, a prominent columellar tooth, and a smaller deep-seated one; lip a little expanded. Length, 12 mill.

*Ins. Mayotte.*

E. DENTIENS, Morelet. Pl. 19, figs. 21, 22.

Shortly rimate, smooth, shining, hyaline, white; last whorl scrobiculate; aperture six-dentate—a parietal lamella, two approximate teeth on the right margin, two others, also approximate, on the columella, and one at the base. Length, 4·5 mill.

*Comoro Isles.*

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E. ACICULA, Morelet. Pl. 20, fig. 27.

Scarcely rimate, hyaline, very slightly costulate, whitish, suture finely denticulate; aperture with parietal lamella and a punctiform palatal callus; lip white, expanded, somewhat reflected. Length, 4·5 mill.

*Comoro Islands.*

E. RAFFRAYI, Bourguignat. Pl. 19, fig. 97.

Rimate, hyaline, vitreous, distantly slightly costulate, suture dentate; aperture with a parietal tooth; lip white, thickened, subreflected. Length, 6 mill.

*Abyssinia.*

E. ISSELI, Paladilhe. Pl. 27, fig. 14.

Narrowly umbilicated, somewhat smooth, subdiaphanous, ivory-white, suture granulate-papillate, last whorl scrobiculate at the aperture; aperture with a parietal lamina, two approximate teeth on the right and a similar pair on the columellar margin, base with a small dentiform tubercle; lip thickened, subreflected. Length, 5 mill.

*Aden, Arabia.*

E. BLANFORDIANA, Godwin-Austen. Pl. 18, fig. 61.

Light corneous, upper whorls faintly costulate, lower ones smooth, very minutely striate; aperture with parietal lamina, and opposite teeth on the columella and right margin; lip thickened, expanded, profoundly sinuate above. Length, 8 mill.

*Mahadeo Peak, North Cachar Hills, Bengal.*

E. FARTOIDEA, Theobald. Pl. 18, fig. 48.

Subrugosely striate, very light corneous, suture serrate; aperture with two lip teeth and a parietal lamina. Length, 4 mill.

*Shan States, India.*

E. VARA, Benson. Pl. 18, fig. 57.

Arcuately rimate, costate, whitish, last whorl scrobiculate; aperture subaxial, not lateral, distorted ear-shaped, lip thickened, dilated, profoundly sinuated above, arcuate within, in the middle of the right margin showing an obtuse decurrent palatal plica, close to which is a strong parietal lamina. Length, 5 mill.

*Khasia Mts., India.*

E. FILICOSTA, Morelet. Pl. 18, figs. 46, 47.

Subrimate, white, shining, hyaline, with longitudinal hair-like ribs; aperture with a parietal plica, a tooth on the right margin

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and a bidentate columellar plica; lip somewhat thickened, shortly expanded, contracted in the middle. Length, 4 mill.

*Angola, Africa.*

E. VERMIS, Morelet. Pl. 20, fig. 37.

Rimate, smooth, shining, diaphanous, whitish; aperture five-toothed—a parietal and a columellar plication, a tooth on the outer lip, and two more at its base; there is, perhaps, a deep-seated tooth in addition, in the throat; lip slightly expanded. Length, 3 mill.

*Isle Mayotte.*

E. TAYLORI, Gibbons. Pl. 27, fig. 15.

Rimate, thin, subdiaphanous, polished, obsoletely costate, the costæ more apparent at the sutures; aperture with a parietal lamina, right margin a little inflected in the middle. Length, 5 mill.

——— *Zanzibar.*

E. SEXDENTATA, Taylor. (Unfigured.) *Zanzibar.*
E. MÖRCHIANA (Röpstorff), Nevill. (Unfigured.) *Nicobar Is.*
E. DOLIOLUM, Morelet. (Unfigured.) *Gabon, W. Africa.*
E. CANARICA (Beddome), Blanford. (Unfigured.)
*Province of So. Canara, Southern India.*

Subgenus DIAPHORA, Albers, 1850.

E. CYLINDRELLOIDEA, Stoliczka. Pl. 20, fig. 25.

Narrowly rimate, costulate, suture deeply impressed, last whorl obtusely carinate at the base, dissolute and a little descending near the aperture; lip continuous, thickened, expanded, aperture with a strong superior lamina, and a tooth on the outer lip. Length, 5 mill.

Near *Moulmein, Burmah.*

E. CUMINGIANA, Pfr. Pl. 20, fig. 23.

Umbilicated, obliquely striulate, shining, hyaline; last whorl dissolute, protracted, carinate above and below, laterally compressed; aperture without teeth, lip continuous, shortly expanded. Length, 9·5 mill.

*Philippines.*

Described as a Cylindrella, which it much resembles.

E. PORRECTA, von Martens. (Unfigured.) *So. East Borneo.*

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## Genus STREPTOSTELE, Dohrn, 1866.

S. LOTOPHAGA, Morelet. Pl. 20, fig. 69.

Longitudinally thinly and regularly striate, suture minutely crenulated; yellowish horn-color. Length, 26 mill.

*Prince's Isl., Gulf of Guinea.*

S. FOLINI, Morelet. Pl. 20, figs. 72, 73.

Subimperforate, striate, diaphanous, hyaline, suture crenulately margined; aperture with the lip a little thickened and somewhat expanded, the columella somewhat twisted.

Length, 16 mill.

*Prince's Island.*

S. BUCHHOLZI, Martens. Pl. 20, fig. 76.

Imperforate, thin, arcuately striate, shining, yellowish white; columella a little twisted, lip simple, not thickened.

Length, 13·5–15·5 mill.

*Bonjongo, W. Africa.*

? S. METULA, Crosse. Pl. 20, fig. 26.

Somewhat covered-rimate, thin, translucent, shining, yellowish, lightly costulate-striate, more distinct at the sutures; margin of aperture simple, columella not folded. Length, 11 mill.

*Nossi Comba, Madagascar.*

### Section ELMA, H. Adams, 1866.

S. FASTIGIATA, Morelet. Pl. 20, fig. 74.

Somewhat covered-rimate, arcuately striate, suture crenulated, hyaline, shining yellowish; lip thickened, callous, emarginate above. Length, 25–26 mill.

*Prince's Island.*

Var. MINOR. Nine instead of ten whorls, columella straight. Length, 17 mill.

According to Dohrn the animal is reddish orange.

S. INCISA, Morelet. Pl. 20, figs. 44, 45.

Subrimate, smooth, semipellucid, shining, horny white, suture minutely denticulate; lip callous, obtuse, shortly reflected, profoundly incised above. Length, 11 mill.

*Ins. Mayotte.*

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S. NEVILLI, H. Adams. Pl. 20, fig. 77.

Imperforate, somewhat solid, a little shining, obsoletely longitudinally striate, whitish, suture margined; columella slightly twisted, lip thin, flexuous and thickened in the middle.

Length, 20 mill. *Seychelles Islands.*

Dr. Dohrn thinks this species more closely related to Gibbulina, and that it should be placed in the vicinity of *G. palanga*, Lesson.

S. MORELETIANA, Dohrn. Pl. 20, fig. 75.

Imperforate, thin, ribbed-striate, shining, pellucid, hyaline; suture margined and distinctly crenulated; columella twisted, obliquely truncate, lip simple, thickened, thinner above.

Length, 6·5 mill.

*Prince's Island.*

S. SWINHOEI, H. Adams. Pl. 17, fig. 30.

Narrowly umbilicate, thin, shining, lightly striate, whitish; lip thin, shortly reflected, attenuated and sinuous above.

Length, 16 mill.

*Formosa.*

S. AURICULATA, Morelet. Pl. 20, fig. 42.

Very shortly rimate, longitudinally costulate, crystalline, whitish; aperture with a tooth-like parietal callus; lip slightly expanded, a little callous, flexuous, slightly incised above, columella dilated above. Length, 9 mill.

*Isle Mayotte.*

S. MARTENSIANA, Morelet. Pl. 20, fig. 47.

Superficially rimate, thin, crystalline, diaphanous, arcuately costulate-striate, suture profoundly denticulate; aperture with a prominent, compressed parietal callus, lip shortly expanded, slightly reflected, a little receding above. Length, 14 mill.

*Ins. Mayotte.*

Section PTYCHOTREMA, Mörch, 1852.

S. MÖRCHI, Pfr. Pl. 19, fig. 1.

Rimate, somewhat solid, striulate, alabastrine, suture margined, last whorl bisulcate below the middle; aperture with two parietal plicæ, columella profoundly plicate, acutely bidenticulate, right margin with a superior tooth, and two long lamellæ within the throat below it. Length, 18 mill.

*Guinea.*

*Pupa Guineensis*, Mörch, is a synonym.

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S. MUCRONATA, Martens. Pl. 19, figs. 9–11.

Rimate, somewhat solid, obliquely striate, yellowish white; aperture with a large flexuous parietal plica, right lip with a superior tubercle and two lamellæ, below it in the throat, columella with two teeth, lip thickened, reflected. Length, 25 mill.

*Bonjongo, W. Africa.*

S. BONJONGOENSIS, Tryon. Pl. 19, figs. 5, 6.

Arcuately rimate, obliquely striate, yellowish white; aperture with a securiform parietal plica, a superior tubercle on the outer lip, and below it two approximate palatal plicæ, a basal tooth and three columellar plicæ; lip thickened, widely reflected.

Length, 14 mill.

*Bonjongo, W. Africa.*

Described by Dr. von Martens as *Ennea Buchholzi*, but that specific name being preoccupied by Martens in Streptostele, and that of *Martensiana* being used by Morelet, I am compelled to make a change of name without the power of extending the usual courtesy in such circumstances.

S. CYATHOSTOMA, Pfr. Pl. 19, fig. 7.

Obliquely rimate, solid, closely longitudinally striate, whitish, suture submarginate; last whorl profoundly bisulcate near the aperture, base subcristate; lip expanded, sinuated above; aperture with a parietal plica, and three lamellæ within the outer lip.

Length, 20·5 mill.

*Old Calabar, W. Africa.*

S. RINGENS, H. Adams. Pl. 19, fig. 20.

Rimate, solid, longitudinally closely striate, whitish, suture narrowly margined, last whorl trisulcate behind the aperture; aperture with a parietal lamina, three profound columellar teeth; and several lamellæ within the outer lip, of which four are longer and more prominent; lip continuous, expanded, sinuous above. Length, 14 mill.

*Sierra Leone, W. Africa.*

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## Family *HELICOIDEA.*

Shell heliciform, with usually depressed conical, or plane spire, sometimes nautiloid, or with depressed spire, generally umbilicated, outer lip simple.

Animal differing from the true Helices by the absence of the jaw, and of the central tooth of the lingual ribbon. Carnivorous.

There is but little to distinguish these mollusks either in the shell or the external characters of the soft parts from some of the groups of Helices, and the number of species of which the mouth-parts have been examined is so small as to forbid anything like an exhaustive list of the Testacelloid genera or species; I can only group around the *known* agnathous forms such others as appear to be related to them by conchological characters: time will show the real value of characters derived from dentition and the presence or absence of a jaw.

### *Synopsis of Genera.*

### Genus GUESTIERIA, Crosse, 1872.

Shell imperforate, corneous, thin, depressed, quite involute, the last enveloping whorl only visible, aperture semilunar, the lip simple. *South America.*

### Genus DIPLOMPHALUS, Crosse and Fischer, 1872.

Shell planorbiform, openly umbilicated, spire depressed, aperture narrow, lip simple. *New Caledonia.*

(*Typical.*)—Shell discoidal, showing the numerous narrow whorls equally above and below, the extremities of the lip connected by a much developed parietal callus.

### Subgenus MONOMPHALUS, Ancey, 1882.

Shell nautiliform, spire somewhat depressed or nearly plane, whorls less numerous than in the typical group, the last large, almost covering the umbilicus.

### Subgenus PSEUDOMPHALUS, Ancey, 1882.

Shell nautiliform, with very narrow whorls and aperture, the last whorl enveloping above and below, so as to exhibit a deep sunken perspective spire and umbilicus.

This form approaches *Guestieria* in appearance, and still more, the European group *Drepanostoma.*

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### Genus MICROMPHALIA, Ancey, 1882.

Shell striated obliquely, or smooth; spire obtuse, number of whorls moderate; umbilical perforation narrow; lip simple, sharp, a little sinuous at the base, with a strong basal tooth at some distance from the margin—which is sometimes not developed. *New Caledonia.*

### Subgenus PLATYSTOMA, Ancey, 1882.

Spire depressed, but little elevated, whorls few; shell thin, smooth or obliquely striated; perforation small; aperture large, the lip sharp, edentulous, or having a single tooth at the base.

### Genus RHYTIDA, Albers. 1860.

Shell umbilicated, thin, convexly depressed, undulately striate or rugose; spire slightly elevated, whorls 4 or 5, somewhat flattened obliquely; umbilicus rather wide and deep; aperture oblong-ovate, sometimes dentate within, lip simple, acute, its extremities approaching.

Animal viviparous; the lingual teeth rather few, oblique, arcuated; no central teeth; no jaw.

*New Zealand, Australia, New Caledonia.*

### Genus PARYPHANTA, Albers, 1850.

Shell rather widely umbilicated, thin, covered by a coriaceous epidermis, enveloping or extending beyond the peristome; aperture oblique, semilunar, peristome simple.

*New Zealand, Australia.*

### Genus ELÆA, Hutton, 1883.

Shell small, epidermis thin, not involving the peristome; umbilicus wide; whorls few, rapidly increasing. *New Zealand.*

### Genus AEROPE, Albers, 1860.

Shell with a small, nearly covered umbilicus; very thin, depressed globose, costulately striate; spire not prominent, obtuse; aperture large, semiovate, lip sharp, simple, columellar margin widely reflected over the umbilicus.

Teeth very long, subulate, arranged in converging rows, and contained in a very large lingual sac.

A single South African species.

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## Genus GUESTIERIA, Crosse, 1872.

G. POWISIANA, Pfr. Pl. 26, figs. 16–18.

Shell very thin, polished, striulate; corneous, brown-rayed. Diam., 18 mill.

*Marmato, New Granada.*

## Genus DIPLOMPHALUS, Crosse and Fischer, 1872.

There is a certain superficial resemblance between this group and *Polygyra*, Say—the latter being Floridian, and belonging to the true Helicidæ.

D. MONTROUZIERI, Souverbie. Pl. 25, fig. 90.

Shell thin, subdiaphanous, light corneous, very minutely obliquely undulately striate; spire depressed, deeply immersed in the middle, suture plicately carinate. Diam. 8, alt. 4 mill.

*New Caledonia.*

D. CABRITI, Gassies. Pl. 25, figs. 91, 92.

Rather thin, scarcely shining, with flexuous suboblique striæ; corneous, crossed by reddish chestnut maculations; centre of spire profoundly immersed, suture crenulately carinate, marginate, last whorl carinate above and below.

Diam. 8, alt. 4 mill.

*New Caledonia.*

First published as *Helix volutella*, a name preoccupied by Pfeiffer.

D. VAYSSETI, Marie. Pl. 25, figs. 1–3.

Rather thin, with suboblique, regular, flexuous impressed striæ; corneous, with reddish chestnut maculations; suture crenulately carinate, last whorl carinate above and below, and marbled or strigate on the somewhat convex side with chestnut-red. Diam. 6·5, alt. 2·5 mill.

*New Caledonia.*

D. MARIEI, Crosse. Pl. 25, figs. 6, 7, 10.

Rather thin, somewhat shining, with impressed flexuous suboblique striæ; corneous, maculated with reddish chestnut; suture submarginate, last whorl angulated above and below,



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the side convex; aperture with white, expanded lip, subreflected below. Diam. 4·5, alt. 2 mill.

*New Caledonia.*

Has fewer whorls (about 7) than the previously described species, is smaller, has a different aperture, and is less concave above and below.

Var. SOLIDULA, Crosse. Fig. 10.

Thicker, slightly larger, lighter colored, last whorl a little more elevated. Diam. 5, alt. 2·5 mill.

D. MICROPHIS, Crosse. Pl. 27, figs. 16, 17.

Small, slightly concave above and below, rather strongly striate-costulate, suture impressed; unicolored olivaceous-corneous; aperture narrowly auriform, lip white, continuous, subreflected, thickened on the columella.

Diam. 1·75, alt. ·5 mill. *New Caledonia.*

A shell of only 4½ whorls, yet adult, as shown by its lip. Very much smaller and less concave above and below than either of the preceding species.

Subgenus MONOMPHALUS, Ancey, 1882.

D. BAVAYI, Crosse. Pl. 25, figs. 95–97.

Spire somewhat depressed, umbilicus rimate, covered, whorls covered by numerous thread-like, sharply raised, dark costulæ on a chestnut-colored surface, lip thin. Diam. 7, alt. 4 mill.

*New Caledonia.*

D. CEREALIS, Crosse. Pl. 27, figs. 18, 19.

Subimperforate, depressed, thin, flexuosely striate-costulate, epidermis yellowish brown. Diam. 5, alt. 1·75 mill.

*New Caledonia.*

D. HECKELIANA, Crosse. Pl. 25, figs. 98–100.

Nearly covered rimate, rather thin, with close fine striæ; chestnut-brown, maculated with whitish around the suture.

Diam. 6·5, alt. 4 mill.

*New Caledonia.*

First described as *Helix Rossiteriana*, Crosse, 1871 (not *H. Rossiteri*, Angas, 1869).

Var. GRAMMICA, Crosse.

Last whorl tessellated with chestnut and yellowish brown.

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Subgenus PSEUDOMPHALUS, Ancey, 1882.

D. FABREI, Crosse. Pl. 24, figs. 85–87.

Widely and perspectively umbilicated, nautiliform, profoundly biconcave, last whorl largely enveloping the others, especially above, translucent, subflexuosely closely striate, reddish brown. Diam. 15, alt. 8·5 mill.

*New Caledonia.*

D. MEGEI, Lambert. Pl. 24, figs. 82–84, 59, 60.

Umbilicated, nautiliform, profoundly biconcave, translucent, very closely finely striate, chestnut-brown. Diam. 9, alt. 7 mill.

*New Caledonia.*

Is smaller, with fewer whorls than the preceding species—of which it may be the young.

Crosse describes a variety (figs. 59, 60) with only 4½ (instead of 5) whorls, dark reddish brown, the apex immersed, whitish; diam. 8·25, alt. 5·5 mill. Probably younger?

D. GENTILSIANA, Crosse. Pl. 24, figs. 62, 63.

Perforated, subnautiliform, numerously, closely, slightly costulate; light olivaceous; whorls 5, the last obtusely angulate near the suture, base subplanate. Diam. 9, alt. 5·5 mill.

*New Caledonia.*

D. VINITINCTA, Cox. Pl. 24, figs. 88, 89.

Openly, deeply umbilicated, spire depressed, sunken; nautiliform, thin, corneous, epidermis reddish chestnut, costulate. Diam. 6·5, alt. 2·5 mill.

*Upper Richmond River, Australia.*

D. OMICRON, Pfr. Pl. 24, fig. 79.

Umbilicated, spire profoundly immersed, umbilicus rather wide, conical; very thin, closely filiformly striate, corneous, obsoletely strigate with chestnut. Diam. 5·25, alt. 3 mill.

Is *Helix ammonitoides*, Reeve. *Australia.*

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D. LIFOUANA, Montrouzier. Pl. 25, figs. 93, 94.

Nautiliform, minutely umbilicated, minutely striate, corneous, epidermis olivaceous, subradiate with brown above; last whorl subangulate above, a little gibbous in the middle, more convex below; lip simple, whitish within the margin.

Diam. 11, alt. 7 mill. *Lifu Island, Loyalty Archipelago.*

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## Genus MICROMPHALIA, Ancey, 1882.

M. CALEDONICA, Crosse. Pl. 24, figs. 76–78. Magn. ¾.

Imperforate, somewhat solid, subpellucid, finely lightly striate; olivaceous brown, irregularly maculate with a few chestnut-brown transverse spots; aperture with a basal lamina.

Diam. 9, alt. 5·25 mill.

*New Caledonia.*

M. ABAX, Marie. Pl. 24, figs. 80, 81.

Scarcely rimate, rather thin, longitudinally striate; light yellowish red, with rather close, trigonal chestnut-brown maculations. the immersed suture bordered by a band of alternate dark chestnut and white maculations; aperture with a strong basal plica, and sometimes an obsolete one above it.

Diam. 13·5, alt. 7 mill.

*New Caledonia.*

M. VIEILLARDI, Crosse and Marie. Pl. 24, figs. 67, 68.

Scarcely subrimate, striate, chestnut-brown, with whitish or rosy-white maculations in the vicinity of the suture, becoming smaller, and zigzagged below; last whorl very obtusely carinated; lip black-margined, columella white, aperture with a basal plica. Diam. 14, alt. 8 mill.

*New Caledonia.*

Var. $\beta$. Subdepressed, slightly smaller, spire less elevated.

The animal is blackish above, brownish posteriorly, rosy-violaceous on the sides, the sole is light rosy-violaceous.

M. BALADENSIS, Souverbie. Pl. 25, figs. 11, 12.

Narrowly umbilicated, depressed, subdiscoidal, very thin, striulate, shining, translucent; light yellowish, lineolated with oblique curved chestnut lines; spire scarcely elevated, suture deep; aperture without plica. Diam. 5, alt. 2·3 mill.

*N. Caledonia.*

M. LOMBARDEAUI, Montrouzier. Pl. 27, figs. 20, 21.

Very narrowly umbilicated, thin, rather distantly acutely costulate-striate; undulately tessellated with chestnut and yellowish white; aperture profoundly bilamellate on the outer wall.

Diam. 10, alt 7·5 mill.

*N. Caledonia.*

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M. CORYMBUS, Crosse. Pl. 27, figs. 22, 23.

Scarcely perforated, rather thin, closely lamelliformly impressly striate; corneous, obscurely reticulated with chestnut-red, at the suture maculated alternately with dark chestnut and yellowish; aperture without plica. Diam. 5·5, alt. 3 mill.

*N. Caledonia.*

Subgenus PLATYSTOMA, Ancey, 1882.

M. SAISSETI, Montrouzier Pl. 25, figs. 4, 5.

Almost imperforate, somewhat thin, rather distantly costulately striate, with intermediate smaller striæ; yellowish white, with chestnut undulating strigations; suture rather deeply impressed, last whorl obtusely subcarinate, blackish around the umbilicus. Diam. 15, alt. 8 mill.

*N. Caledonia.*

M. ASTUR, Souverbie. Pl. 25, figs. 8, 9. Magn. $\frac{2}{1}$.

Scarcely perforate, thin, closely arcuately plicately striate, greenish corneous, under an olivaceous brown epidermis, which is radiately undulately strigate with chestnut; whorls 4, the last subdepressed, obtusely subcarinate. Diam. 7, alt. 3 mill.

*N. Caledonia.*

M. CHELONITIS, Crosse. Pl. 27, figs. 24, 25.

Scarcely perforate, rather smooth, thin, pellucid; light yellowish, maculated and reticulated with chestnut, some of the maculations stronger above. Diam. 7·5, alt. 4 mill.

*N. Caledonia.*

Genus RHYTIDA, Albers, 1860.

* *Aperture lamellate.*

R. BERAUDI, Gassies. Pl. 23, figs. 35–37.

Subcarinate, widely, perspectively umbilicated, orange-brown above, reddish brown below, with reddish incremental striæ; whorls rugosely striate, decussated, especially below by revolving impressed lines; aperture bidentate, lip simple.

Diam. 18, alt. 10 mill.

*N. Caledonia.*

R. SUBSIDIALIS, Crosse. Pl. 23, figs. 38, 39.

Widely, perspectively umbilicated, spirally sulcate, the sulcæ

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more conspicuous below, somewhat shining; yellowish chestnut; suture deeply impressed; lip with a basal tooth.

Diam. 15, alt. 7 mill.

*N. Caledonia.*

Var. $\beta$. Globose, smaller, darker color. Diam. 11, alt. 7 mill.

R. MULTISULCATA, Gassies. Pl. 23, figs. 40–42. Magn. $\frac{2}{1}$.

Rather thin, translucent, lightly striulate, with impressed spiral lines; whorls 5, suture submarginate; yellowish corneous, somewhat shining, occasionally strigate with chestnut; aperture with a light basal tooth. Diam. 7–11, alt. 4–7 mill.

*N. Caledonia.*

Vars. *minor*, *depressa* and *unicolor* have been described; in the latter the chestnut strigations are absent.

R. COGUIENSIS, Crosse. Pl. 24, figs. 64, 65.

Somewhat obliquely rugosely striate, with numerous spiral lines, somewhat shining; yellowish olivaceous, longitudinally variegated with chestnut, and encircled with dark chestnut bands, one above, one on the periphery, a third on the base, and a fourth around the umbilicus; behind and near the middle of the outer lip with a slight external scrobiculation; aperture bluish white, showing the bands, with a deep-seated basal lamella.

Diam. 12·5, alt. 6·5 mill.

*N. Caledonia.*

Var. TRIFASCIATA. Upper band wanting.

Var. MONOZONARIA. Described from a specimen in poor condition, without the basal tooth; perhaps a juvenile.

R. FERRIEZIANA, Crosse. Pl. 24, figs. 69, 70.

Obliquely rugosely striate, encircled by rather distant impressed spiral lines; dark brown or chocolate; aperture colored as externally, with a basal lamella. Diam. 14·5, alt. 8 mill.

*N. Caledonia.*

Var. $\beta$. Somewhat smaller, the periphery with a narrow yellowish revolving band.

Var. $\gamma$, MONOZONARIA. Smaller, yellowish brown, with chestnut variegations, spire more flattened, last whorl with a broad chestnut band above the periphery, base multisulcate.

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R. TESTUDINARIA, Gassies. Pl. 24, fig. 66.

Turbinately depressed, moderately solid, obliquely rugosely striate, with impressed spiral lines, more visible on the periphery and subplanate base; shining, yellowish olivaceous, with a superior dark chestnut band; last whorl flattened obliquely at the aperture; aperture bluish white, showing the band, with a basal lamella and slight exterior pit. Diam. 13, alt. 7 mill.

*New Caledonia.*

Was described from juvenile specimens. *R. Paulucciæ*, Crosse, which I have figured, is the adult. Is *R. Coguiensis*, Crosse, a variety of this species?

R. BRUNIANA, Gassies. Pl. 28, figs. 37, 38.

Rather thin, shining, striulate; yellowish brown, with chestnut maculations at the suture, and chestnut oblique, flexuous lines over the rest of the shell, becoming indistinct on the base; last whorl subangulated on the periphery, slightly scrobiculate at the base, corresponding with a lamella at the base of the aperture; umbilicus narrowly perforate. Diam. 9, alt. 3 mill.

*New Caledonia.*

R. TURNERI, Pfr.

An unfigured species, with nearly closed umbilicus, depressed, subdiscoidal, rather thin, diaphanous, a little shining, closely striate; yellowish brown, variegated with chestnut lines and spots, and maculated at the rather deep, denticulated suture; aperture with a median basal lamella. Diam. 7·25, alt. 3 mill.

*New Caledonia.*

The description appears to agree pretty well with *R. Bruniana.*

R. VILLANDREI, Gassies. Pl. 23, figs. 45, 46, 43, 44.

Subcarinate, strongly striated, shining; brownish yellow undulately strigate with chestnut; suture linear, subplicate; aperture yellowish brown, not toothed. Diam. 25, alt. 10 mill.

*New Caledonia.*

*R. Boydii*, Angas (figs. 43, 44), is a synonym.

R. RAYNALI, Gassies Pl. 23, figs. 47, 48.

Lightly rugosely striated, with close slight impressed spiral lines above; shining, yellowish chestnut, with chestnut zigzag lines more or less broken up into spots; suture linear, subplicate. Diam. 33, alt. 17 mill. *New Caledonia.*

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R. OUVEANA, Souverbie. Pl. 23, figs. 49, 50.

Thin, subpellucid, closely arcuately striate, with spiral impressed lines; yellowish, inconspicuously fasciated with yellowish brown; last whorl subcarinated on the periphery.

Diam. 7·5, alt. 3 mill.

*Ouvea, Loyalty Islands.*

R. RUFOTINCTA, Gassies. Pl. 22, fig. 13.

Very widely umbilicated, discoidal, thin, longitudinally and transversely striate; yellowish red, shining, with chestnut rays above and below; whorls 3½, with profound suture, flattened above, convex below, the last not descending; aperture yellowish, lip simple. Diam. 5, alt. 2 mill.

*New Caledonia.*

R. LUTEOLINA, Gassies. Pl. 23, figs. 52, 53.

Closely striate and spirally sulcate; shining, orange-brown, indistinctly darker banded on the subcarinate periphery; suture sulcately crenate. Diam. 6, alt. 3 mill.

*Isle of Pines, New Caledonia.*

R. YAHOUENSIS. Gassies. Pl. 28, figs. 43–45.

Closely striulate, with spiral impressed lines, somewhat shining, yellowish corneous. Diam. 5, alt. 2 mill.

*New Caledonia.*

Has a more open umbilicus, and is without the peripheral band of *R. luteolina*.

R. DEPLANCHESI, Gassies. Pl. 24, fig. 61.

Thinly striate, with spiral impressed lines; whorls 3½, rapidly increasing; shining, orange-brown, with a chestnut band on the subcarinate periphery; aperture yellowish, showing the band. Diam. 7, alt. 3 mill.

*Lifu, Loyalty Is.*

R. COSTULIFERA, Pfr. Pl. 28, figs. 31, 32.

Conically depressed, thin, diaphanous, rather closely arcuately striate; yellowish brown, with chestnut maculations at the suture, and chestnut zigzag lines covering the surface; periphery subangulated, base somewhat plane, angulated next the conical umbilicus. Diam. 6·5, alt. 2 in.

*Isle of Pines, New Caledonia.*

Crosse has described a var. *major*, with 6 whorls, instead of 5; diam. 7·25, alt. 4 mill.

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R. PINICOLA, Pfr. Pl. 28, figs. 33, 34.

Depressed, thin, closely arcuately striate; yellowish brown, maculated with chestnut at the suture, elsewhere covered with zigzag chestnut lines; whorls 5, spire plane.

Diam. 7·5, alt. 3 mill.

*Isle of Pines, New Caledonia.*

Is more depressed than the preceding species, and has not its angulated periphery and umbilicus.

R. ORIUNDA, Gassies. Pl. 28, figs. 46–48.

Shell with rather wide umbilicus, fragile, pellucid, shining, finely spirally striate; yellowish, with chestnut undulating lines and maculations, the former paler and finer around the umbilicus.

Diam. 5, alt. 3 mill.

*New Caledonia.*

R. BAZINI, Crosse. Pl. 28, figs. 35, 36.

Subdiscoidal, thin, very closely arcuately striate; light corneous, with angulated zigzag chestnut lines, and maculations of the same color at the suture; spire somewhat plane, whorls 4½, with deep suture, the last whorl not descending, obsoletely subangulate on the periphery, the base somewhat plane, with a conical umbilicus. Diam. 5, alt. 1·5 mill.

*New Caledonia.*

A smaller, more depressed shell than the related species. Crosse has distinguished a var. *minor*, less distinctly striate, the color darker, the lines of chestnut broader.

Diam. 4, alt. 1·25 mill.

R. INÆQUALIS, Pfr. Pl. 24, figs. 57, 58.

Shell rather solid, densely obliquely rugosely striate above, smoother and shining below, with impressed spiral lines; yellowish brown, with a few light chestnut strigations, often with a chestnut band on the periphery. Diam. 22, alt. 9 mill.

*New Caledonia, Isle of Pines.*

*R. Fischeri*, Gassies, is founded upon a uniformly chestnut-colored variety of this shell.

R. SINCLAIRI, Pfr. Pl. 24, figs. 71, 72.

Shell thin, regularly closely costate-striate; orange-brown, with numerous interrupted chestnut revolving bands and lines;

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whorls 4, rapidly increasing, the last depressed, deflected in front, suture deep. Diam. 17, alt. 7·5 mill.

*Tasmania.*

R. KANAKINA, Gassies. Pl. 28, fig. 26.

Widely umbilicated, depressed, rather solid, obliquely rugosely plicatulate; shining corneous, irregularly maculated with chestnut dots; whorls 4, slightly convex, the last not descending, base subplanate, umbilicus conical, bordered with chestnut; aperture shining corneous. Diam. 7, alt. 3·5 mill.

*N. Caledonia.*

R. CANDELOTI, Crosse and Marie. Pl. 28, figs. 27, 28.

Depressed, discoidal, very widely umbilicated, thin, pellucid, obsoletely costulate-striate; light orange-brown, strigate with chestnut, the last whorl slightly cingulated with white below the periphery. Diam. 6·5, alt. 2 mill.

*N. Caledonia.*

A variety has been described, greenish yellow, the strigations obscure, a little larger than the type.

R. LAMBERTI, Gassies. Pl. 28, figs. 29, 30.

Lenticular, thin, pellucid, transversely slightly, longitudinally more strongly striated; orange-brown; spire nearly plane; whorls 5, rapidly increasing, the last not descending.

Diam. 8, alt. 2·5 mill.

*New Caledonia.*

R. OCCLUSA, Gassies. Pl. 28, fig. 40.

Very narrowly umbilicated, depressed, subdiscoidal, somewhat thin, obliquely costulate above; yellowish brown, with undulating chestnut lines and spots, and more distinct maculations at the suture; suture crispate. Diam. 6, alt. 3 mill.

*New Caledonia.*

Has not the basal callosity of *R. Turneri* and *Bruniana*, which it somewhat resembles otherwise.

R. GOULARDIANA, Crosse. Pl. 24, figs. 54–56.

Umbilicus narrow, almost covered, shell somewhat solid, flexuosely, subobliquely costulate; epidermis very thin, somewhat deciduous, orange-brown; suture profound, subcanaliculate in the last whorl; periphery subangulate; last whorl not descending; its base subplanate, costulate; interior bluish white.

Diam. 12, alt. 5 mill. *N. Caledonia.*

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R. PREVOSTIANA, Crosse. Pl. 28, figs. 41, 42.

Umbilicus perforate, partly covered, thin, with subdistant lamelliform striæ; yellowish brown, more or less maculated with light chestnut, particularly at the suture; whorls 5, with impressed suture, base subplanate and regularly costulate.

Diam. 6, alt. 4·5 mill.

*New Caledonia.*

The color varies, sometimes uniform horny-white, or dark corneous, or horny-white more or less maculated with orange-brown.

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R. PTYCHOMPHALA, Pfeiffer. Pl. 22, figs. 16–18; Pl. 28, fig. 39.

Rather thin, glossy, closely, irregularly, frequently anastomosely striated, without spiral sculpture; olive-brown, with some more or less distinct chestnut strigations, and a faint yellow band around the umbilicus; whorls 4½, the last inflated and deflected at the mouth, somewhat flattened.

Diam. 1·4, alt. ·5 inch.

*Port Essington, Australia.*

Figs. 17, 18, from Küster, represent a shell not fully grown, and without the yellow umbilical band; Pfeiffer's original description is based on a similar shell. I add (fig. 16) a fully developed shell from Cox's work, and a smaller one (fig. 39) from Reeve.

R. LEICHARDTI, Cox. Pl. 22, fig. 23.

Widely umbilicated, somewhat solid, closely obliquely costulate above, scarcely shining, opaque; olivaceous red; whorls 4½, the last descending at the aperture. Diam. 1·4, alt. ·65 inches.

*Australia.*

R. STRANGEI, Pfr. Pl. 22, fig. 27; Pl. 28, fig. 49.

Umbilicated, rather thin, shining, pellucid, closely striate above, decussated by very numerous impressed spiral lines; yellowish, reddish or horny chestnut, sometimes with light chestnut strigations; whorls 5, not descending in front; base nearly smooth, glossy. Diam. 1, alt. ·4 inch.

*New South Wales.*

R. LINCOLNIENSIS, Pfr. Pl. 22, fig. 28.

Umbilicated, thin, strongly closely striate and slightly granu-

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lated above, pellucid; light chestnut-colored; whorls 5, the last not descending in front, lightly radiately striated around the umbilicus. Diam. 22, alt. 12 mill.

*Port Lincoln, Australia.*

Something like *R. Strangei*, but smaller, with more transverse aperture and narrower umbilicus, and without revolving sculpture.

R. LAMPROIDES, Cox. Pl. 23, fig. 51.

Umbilicated, thin, closely irregularly ribbed-striate; reddish corneous, scarcely shining, lighter and more polished below; whorls 4, rapidly increasing, the last not descending, depressed above, more convex below, the periphery subangulated.

Diam. 14, alt. 5·5 mill.

*Tasmania.*

R. BULLACEA, Pfr. Pl. 22, figs. 25, 26, 24.

Umbilicated, thin, glossy, pellucid, above closely filiformly striate; reddish, horny; whorls 4, rapidly increasing, the last slightly depressed above, but not descending at the mouth, base convex, very faintly radiately striated, yellowish horny, very glossy. Diam. 17·5, alt. 6·25 mill.

*Clarence and Richmond Rivers, Australia.*

Dr. Cox, with some doubt, refers his *H. assimilis* to this species as a synonym. Fig. 24, figured by Reeve from the type in the Cumingian collection, shows strigations which are not mentioned in Pfeiffer's description made from the same shell, nor do they exist in Dr. Cox's specimens.

R. SHERIDANI, Brazier. Pl. 22, figs. 14, 15.

Umbilicated, thin, closely finely obliquely striated above; reddish chestnut; whorls 4½, the last large, flattened at the suture, base convex, slightly striate, more conspicuously so in the umbilicus; aperture bluish within. Diam. 28, alt. 16·6 mill.

*Cardwell, Rockingham Bay, N. E. Australia.*

R. NAMOIENSIS, Cox. Pl. 22, figs. 19, 20.

Profoundly, rather narrowly umbilicated, thin, transparent, everywhere smooth, shining; light olive-brown; whorls 5, the last not descending; aperture opalescent within.

Diam. ·93, alt. ·53 inch.

*Namoi River, New South Wales.*

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R. CONFUSA, Pfr. Pl. 22, figs. 21, 22.

Umbilicated, rather thin, glossy, closely finely striated; yellowish, reddish, or reddish chestnut, sometimes with irregularly radiating chestnut strigations; whorls 4, the last wide and inflated, rather flattened above, not descending in front; base convex, smoother and more shining than the upper surface.

Diam. 1·45, alt. ·6 in.

*Australia.*

A var. $\beta$ is not so shining and more distinctly striate on the last whorl; chestnut-color.

R. LAMPRA, Pfeiffer. Pl. 23, fig. 29.

Somewhat narrowly umbilicated, thin, very closely arcuately striated, polished; yellowish brown, greenish chestnut or olivaceous, the base smoother and lighter-colored; whorls 4 (scarcely), the last not descending. Diam. 20, alt. 10 mill.

*Tasmania.*

R. CAPILLACEA, Fér. Pl. 23, figs. 30–32.

Closely regularly striated above, glossy, thin; horny yellow; whorls 4, the last somewhat flattened above, more convex, smoother and more glossy below. Diam. 1, alt. ·27 inch.

*Port Jackson, Australia.*

Dr. Cox suspects that *R. Strangei*, Pfr., should be a synonym; it differs by its revolving sculpture, but that is variable in distinctness, and I am much inclined to Dr. Cox's opinion.

R. JAMESI, Brazier.

An unfigured species approaching *R. capillacea*. It differs in being flatly depressed, nearly smooth, showing very faint silky lines, which become more rib like at the suture; color bright horny yellow, strigated with brownish yellow; shell thinner, and umbilicus wider. Diam. 21, alt. 8 mill.

*Palm Isl., N. E. Australia.*

R. STRANGEOIDES, Cox. Pl. 23, figs. 33, 34.

Depressed, somewhat discoidal, thin, transparent, shining, irregularly, rather coarsely striated, decussated with numerous fine close spiral lines; yellowish horny; whorls 4, the last depressed above, convex and nearly smooth below.

Diam. 10, alt. 4 mill.

*Moreton Bay, Australia.*

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*Unfigured Australian Species.*

R. WALKERI, Gray. Unidentified. Appears to be related to *R. capillacea.* *New Holland.*

R. LANGLEYANA, Brazier. *Macquarie Harbor, W. coast of Tasmania.*

R. HOBSONI, Brazier. *Palm Island, N. E. coast of Australia.*

R. BEDDOMEI, Brazier. *Albany Island* and *Cape York.*

***

The following New Zealand forms might well constitute a distinct section or subgenus, characterized principally by the malleated surface, angulated periphery and umbilicus, etc.

R. DUNNIÆ, Gray. Pl. 24, fig. 73.

Umbilicated, irregularly granularly or malleately closely striated; orange-brown; whorls 4, planulate, the last slightly descending at the aperture, base flatly convex, umbilicus infundibuliform. Diam. 24, alt. 11 mill.

*New Zealand.*

Var. *β.* Olivaceous brown, last whorl with five elevated close spiral striæ below the periphery.

R. GREENWOODII, Gray. Pl. 24, fig. 74.

Umbilicated, rather thin, rugosely and malleately striate; olivaceous brown; whorls 4, the last obtusely subangulated at the periphery, with interrupted irregular spiral cord-like striæ; umbilicus infundibuliform, chestnut-color.

Diam. 23·5, alt. 12 mill.

*New Zealand.*

Is *R. Gunnii*, Gray (MS.). The periphery is much less angular, the body-whorl and aperture much more oblique than the preceding species; differs also in its colored umbilicus.

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*Unfigured Species.*

R. PATULA, R. CITRINA, R. AUSTRALIS (perhaps a var. of *citrina*), all of Hutton. *New Zealand.*

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## Genus PARYPHANTA, Albers, 1850.

P. BUSBYI, Gray. Pl. 26, figs. 23, 24.

Opaque, very thin, whitish, under a thick, shining, greenish black epidermis, enveloping the peristome; whorls 4½, the last descending in front; lip of aperture simple, somewhat inflected.

Diam. 66, alt. 29 mill.

*New Zealand.*

The epidermis is so strong, that in the contraction of drying on dead specimens it often breaks the shell.

P. HOCHSTETTERI, Pfr.

An unfigured species, about the same size as *P. Busbyi*, but depressed, with 5½ whorls, more slowly increasing, umbilicated, irregularly rugate; yellowish brown, with close undulating chestnut lines on the upper part of the shell, last whorl subangulate on the periphery, irregularly foveolate and more shining below, with wider chestnut markings; lip simple, submembranaceous in front.

*New Zealand.*

P. GILLIESI, E. A. Smith.

Shell umbilicated, thin, flexible, smooth and rather glossy, with growth-lines, and obsolete spiral striæ upon the upper surface; dark chestnut, with spiral yellowish lines varying in number and width; whorls five or six, shrunken in drying, in which state the last whorl is obtusely keeled, or inflated when stuffed with cotton, not united at the suture to the preceding volution for some distance from the aperture; aperture oblique, without a shelly lining; lip thin, arcuate above.

Diam. 35, alt. 14 mill.

*Whakmarana Mts., New Zealand.*

Unfigured.

P. ATRAMENTARIA, Shuttleworth. Pl. 26, figs. 5, 6.

Perforate, subdiaphanous, very dark chocolate black, above lightly undulately rugulose, below smooth and very shining; whorls 4, rapidly increasing, the last depressed and deflected in front; interior similarly colored or bluish, the margin flexuosely produced above, invested with the shortly inflexed epidermis.

Diam. 30, alt. 14 mill.

*Victoria, Australia.*

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P. FUMOSA, Tenison-Woods. Pl. 28, figs. 55, 56.

Narrowly umbilicated, depressed turbinate, rather thin, highly polished, translucent, rugosely striated by growth-lines, suture finely corrugated, smoky horn-color or nearly black, apex whitish; whorls 3½, the last obliquely sloping above; peristome with incurved cuticular margin. Diam. 22, alt. 18 mill.

*Dandenong Ranges, Victoria, Australia.*

Something like *P. atramentaria*, but smaller. Described as a Helicarion, but undoubtedly belongs in this group.

P. URNULA, Pfr. Pl. 26, fig. 14.

Covered perforate, thin, submembranaceous, irregularly obliquely sulcated and malleated, pellucid, slightly shining; greenish brown; whorls three, convex, very rapidly increasing, the last large, obliquely flattened above, base subexcavated; lip simple, subinflected. Diam. 16, alt. 9 mill. *New Zealand.*

P. OPHIRIA, Pfr. Pl. 26, figs. 7, 8.

Subperforate, very thin, membranaceous, radiately rugate, with minute light spiral lines; pellucid, greenish corneous; whorls 5, the last subangulate at the periphery, rounded in front, base inflated; peristome subinflected. Diam. 20, alt. 11·5 mill.

*Mt. Ophir, Malacca.*

Is *Vitrina heliciformis*, Pfr., described from an imperfect specimen.

P. OMEGA, Pfr. Pl. 26, fig. 28.

Imperforate, somewhat smooth; epidermis corneous brown; whorls 4, a little flattened, rapidly increasing, the last depressed, base flattened, impressed in the middle; lip simple.

Diam. 9·5, alt. 4 mill. *New Zealand.*

*Helix compressivoluta*, Reeve, is a synonym.

P. PHLOGOPHORA, Pfr. Pl. 26, fig. 10. Mag. ¾.

Imperforate, very thin, striulate, shining, pellucid; yellowish brown, with serrulate, angulated chestnut lines; whorls 3½, rapidly increasing, the last not descending, with somewhat flattened base, impressed in the middle; lip simple.

Diam. 7, alt. 3·5 mill. *New Zealand.*

The synonyms are *H. multilimbata*, Hombr. et Jacq., and *H. flammigera*, Pfr.

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## Genus ELÆA, Hutton, 1883.

E. JEFFREYSIANA, Pfr. Pl. 26, fig. 26.

Widely umbilicated, thin, distinctly striate, pellucid, yellowish, with chestnut strigations; suture irregularly plicatulate; whorls 4, the last not descending. Diam. 7, alt. 3 mill.

*New Zealand.*

E. OBNUBILA, Reeve. Pl. 26, fig. 27.

Umbilicated, dark brown, with oblique striæ and impressed spiral lines decussating the surface; whorls 5, plano-convex; lip simple, acute. Alt. 3·5 mill.

*New Zealand.*

Is *Helix sigma*, Pfr. MS.

E. CHIRON, Gray. Pl. 26, fig. 19.

Umbilicated, distantly arcuately plicatulate; epidermis shining, olivaceous brown; whorls 3½, the last subdepressed; base convex, umbilicus narrow; lip somewhat spreading, a little incised above. Diam. 6, alt. 3 mill.

*New Zealand.*

E. RAPIDA, Pfr. Pl. 26, fig. 13.

Umbilicated, thin, slightly spirally striate, crossing the growth-lines, shining, pellucid; chestnut-color with yellowish spots and lines; whorls 3½, rapidly increasing, the last wide, depressed, periphery rounded, not descending anteriorly; lip simple, acute. Diam. 7·66, alt. 3 mill.

*New Zealand.*

Var. β, MAJOR. Yellowish, with an articulated wide chestnut band at the suture. Diam. 9·5 mill. *Solomon's Is.*

E. SPLENDIDULA, Pfr. Pl. 26, figs. 20–22.

Widely umbilicated, striatulate, obsoletely reticulated by spiral lines; light olivaceous-corneous; whorls 3½, subplanulate, with deep sutures, rapidly increasing, the last wide, not descending in front; lip simple, acute. Diam. 8·5, alt. 3·5 mill.

*Torres Straits, Australia; Lizard Islands.*

E. LAMBDA, Pfr. Pl. 26, fig. 25.

Umbilicated, thin, somewhat smooth, with spiral lines, scarcely shining, diaphanous; yellowish brown, strigate with chestnut;



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whorls 5, the body-whorl not descending, obsoletely angulated at the periphery; umbilicus moderate, conical; aperture shining within, lip simple. Diam. 13, alt. 7 mill.

*New Zealand.*

Is *H. igniflua*, Reeve (figured above).

E. CREBRIFLAMMIS, Pfr. Pl. 26, fig. 9. Magn. $\frac{3}{4}$.

Somewhat widely umbilicated, thin, slightly striated, shining, pellucid; yellowish, with angulated chestnut strigations; whorls $3\frac{1}{2}$, the last not descending, subdepressed, the base more convex; lip simple, a little arcuate. Diam. 7, alt. 3 mill.

*New Zealand.*

Is probably *H. infundibulum*, Hombr. et Jacq.

E. CORESIA, Gray. Pl. 26, fig 15.

Widely umbilicated; epidermis thick, shining, obsoletely striate, olivaceous-corneous, strigate with chestnut; whorls 3, rapidly increasing, the last subdepressed, not descending, dilated; lip simple, thin, epidermally inflected. Diam. 4, alt. 1·6 mill.

*New Zealand.*

The characters of the epidermis would appear to place this in *Paryphanta*, yet Prof. Hutton specially cites it as a member of his new genus.

E. BICONCAVA, Pfr. Pl. 24, fig. 75.

Widely umbilicated, closely arcuately costate, opaque; yellowish horn-color, with chestnut strigations; spire concave, whorls $4\frac{1}{2}$–5, narrow, the last rounded, not descending, lip simple. Diam. 5, alt. 2 mill.

*New Zealand.*

E. MILLESTRIATA, Smith. Pl. 28, figs. 50, 51.

Thin, horn-color, perspectively umbilicated; with very close arcuate riblets, and microscopic spiral lines, smoother below; whorls five, with deep suture, last whorl not descending in front; lip simple, thin. Diam. 7, alt. 3 mill.

*Dupuch's I., W. Australia.*

E. VERNICOSA, Krauss. Pl. 28, figs. 52–54.

Umbilicated, thin, closely striated above, smoother and polished below; greenish yellow; whorls $4\frac{1}{2}$, the last a little

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obliquely flattened above, more convex below, umbilicus moderate, perspective. Diam. 12, alt. 6 mill.

*Natal, So. Africa.*

Var. $\beta$, MINOR. Striæ less marked.

Mr. Binney writes of this, that it "is placed by von Martens in *Pella*, a subgenus of *Helix*. On examining the animal, however, I find it has no jaw, and that its lingual membrane presents the usual characters of *Rhytida*. Mr. Gibbons informs me 'that the animal wants the characteristic labial palpi of the latter genus.' There appears to be no central tooth." (Ann. N. Y. Acad. Sci., 355, 1879.)

## Genus AEROPE, Albers, 1860.

A. CAFFRA, Férussac. Pl. 25, figs. 13, 14.

Perforate, inflated, thin, fragile, costulate-striate; greenish irregularly strigate with greenish brown; whorls 4; aperture large, somewhat pearly within. Diam. 51, alt. 30 mill.

*Cape of Good Hope.*

Var. WESSELLIANA, Maltzan. Fig. 14.

Covered perforate, last whorl more obliquely depressed, incremental striæ smaller; aperture oblique.

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* *Gnathophora.*

Mouth armed with a jaw. Mostly phytophagous.

† *Holognatha.* Jaw simple, without superior appendage. Vitrini, Helices, Bulimi, Cylindrellæ, Pupæ, Limaces, etc.

†† *Elasmognatha.* Jaw with a superior quadrangular accessory plate. Succineæ.

† *Holognatha.*

## Family *VITRINIDÆ.*

Animal with or without a caudal mucous pore, the tail sometimes obliquely truncate; mantle-margin sometimes more or less reflexed over the sides, or entirely covering the shell, which the animal is frequently too large to entirely enter, locomotive disk longitudinally tripartite.

Jaw not ribbed, with a median inferior projection.

Shell usually thin, corneous, transparent, normally spiral, of few, rapidly enlarging whorls; sometimes a plate, with or without spiral nucleus.

*Synopsis of Genera.*

* *Without caudal mucous pore.*

### Genus VITRINA, Draparnaud, 1801.

Shell imperforate or very narrowly perforate, depressed or subglobose, very thin, corneous, pellucid; spire small, whorls few, rapidly increasing, the last large; aperture large, lunate or rounded, the columellar margin slightly inflected, peristome often membranaceous. Animal (Pl. 29, fig. 3), proportionally to the shell, large, not able to withdraw into its shell, or entering it with difficulty; body elongated, tail short, without mucous pore; mantle covering a part of the neck, reflected over the margin of the shell, and furnished with a spatulate posterior lobe on the right side, continually moving over the surface of the shell, which it polishes. Jaw (Pl. 29, fig. 1) with an inferior rostriform projection. The central tooth of the lingual ribbon is tricuspid, the laterals, and the thin acuminated marginals, bicuspid (Pl. 29, fig. 2).

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Vitrinas live in moist situations, among loose earth, stones,

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grass, and moss; they are very lively animals, frequently in motion, and when touched will sometimes jump several inches from the ground. Like the slugs, they are occasionally carnivorous.

About 100 species have been described, but on account of the uniformity of their general character, some of these are doubtless nominal. The distribution is almost universal, but the animal in most of the species of tropical countries is still unknown to us, and many of these may prove to belong to the genus Helicarion or to some group intermediate between that genus and Vitrina. The typical Vitrinas are natives of temperate or boreal regions of the northern hemisphere, or of mountain heights in its warmer countries, and are capable of withstanding a low temperature, even crawling about on the surface of the snow. They first occur fossil in the eocene formation of Europe. The typical Vitrinas have been divided into four sections:

* *Shell imperforate.*

Section SEMILIMAX, Stabile, 1859. Animal not able to withdraw entirely within its shell; the mantle much developed. Shell oval-elongated.

Section PHENACOLIMAX, Stabile, 1859. Animal capable of entire retraction, forming a vitreous epiphragm; mantle moderately developed. Shell oval.

** *Shell narrowly perforate.*

Section OLIGOLIMAX, Fischer, 1878. Mantle scarcely extending beyond the shell in front; the animal capable of complete withdrawal. Shell striated, orbicular.

Section GALLANDIA, Bourguignat, 1880. Animal wholly retractile. Shell conoidal, the last whorl angular; umbilicus subperforated.

## Genus VITRINOIDEA, Semper, 1873.

Shell depressed globose, almost membranous, entirely concealed by the mantle-lobes. Foot elongated, tail without mucous pore. Jaw smooth, marginal teeth tricuspid (Pl. 29, fig. 4).

*Philippines.*

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### Genus VITRINOPSIS, Semper, 1873.

Shell resembling Vitrina, protected by two mantle-lobes, one of which is on the right side and anterior, the other on the left side. No mucous pore. Marginal teeth tricuspidate.

*Philippines.*

### Genus PARMELLA, H. Adams, 1867.

Known only by its shell. Depressed, spire flat, epidermis horny, polished, extending greatly beyond the posterior part of the margin. 1 sp. *Fiji Islands.*

Possibly identical with Vitrinopsis.

### Genus VITRINOCONUS, Semper, 1873.

Shell thin, umbilicated, helicoid, spire conical, with obtuse apex; whorls planulate, the periphery of the body-whorl more or less angulated, and the base flattened; aperture lunate, with sharp or thickened peristome, cervical lobes of the mantle moderate, no polishing lobe as in Vitrina; locomotive disk longitudinally tripartite. Marginal teeth bicuspidate (Pl. 29, fig. 5).

*Philippines.*

Differs from Zonites in the absence of the mucous pore and in having the tripartite locomotive disk.

### Genus PLUTONIA, Stabile, 1864.

Body compressed and carinated behind, rugose; mantle median, free in front, with posterior pulmonary orifice; posterior extremity subtruncated, without mucous pore; jaw without ribs or median rostriform protection; teeth like Testacella. Internal shell-plate oblong, Ancyliform, with a rudimentary spire. *Azores.*

The shell of this genus was considered by Morelet and Drouet, who described it, a recent representative of the genus Viquesnelia, Desh., 1857; a name given to certain nummulitic fossils of Roumelia. The identification was, however, imaginary.

This and the following genus, together with Selenites (*Helix concava*, Say), constitute the family Selenitidæ, Fischer, characterized by the dentition of Testacellidæ, with the jaw of Limacidæ (Jaw, Pl. 29, fig. 6; dentition, Pl. 29, figs. 7–9).

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### Genus TRIGONOCHLAMYS, Böttger, 1881.

Animal limaciform, with two dorsal and two lateral grooves directed from the mantle towards the head; shield behind the middle of the body, very small, attached all around, granular; anal and respiratory orifices behind the right margin of the shield; tail short, compressed, carinated, without mucous pore; jaw without ribs, teeth like Testacella. No internal shell? *Caucasus.*

### Subgenus PSEUDOMILAX, Böttger, 1881.

Differs in its shield being free in front and on the right side. No internal shell? *Caucasus*, etc.

** *With mucous pore.*

### Genus DAMAYANTIA, Issel, 1874.

Animal limaciform; mantle a visceral sac, anterior, convex behind, well separated from the foot; tail with a mucous pore; respiratory orifice on the right side, anterior to the mantle; sole longitudinally bisulcate; jaw unknown. No internal shell?

Described from a single specimen. Appears to be related to Parmarion.

### Genus LACONIA, Gray, 1855.

Shell subglobose, entirely and permanently covered by a thin expansion of the mantle; spire of few whorls, the last very large; aperture very large, lunate.

Animal with subglobose body; mantle edged, produced in front, forming a broad collar, tail with a mucous pore.

The habitat of the single species is unknown, and the mollusk and its shell are only known by a figure in Férussac's "Histoire nat. des Moll."

### Genus MARIAELLA, Gray, 1855.

Shell internal, entirely concealed by the mantle, rudimentary, oval, thickened, calcareous, with epidermis, nucleus scarcely spiral, upper surface slightly convex. Young shells are concave below, adults are much thickened and flattened below.

Animal limaciform, subcylindrical, truncated behind, with a linear mucous pore; mantle large, anterior, concealing the shell; locomotive disk distinct. Jaw smooth, with a median projec-

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tion. Lingual membrane with tricuspid centrals and laterals, and aculeate bifid marginal teeth.

### Subgenus TENNENTIA, Humbert, 1862.

Shell internal, at the posterior part of the mantle, shining and a little convex above, flattened below, the apex posterior and recurved to the right and base.

Mantle free in front.

### Genus UROCYCLUS, Gray, 1864.

Animal limaciform, elongated; tail tapering, carinated above, with mucous pore without horn-shaped process; mantle granular, anterior, with a narrow anterior perforation; locomotive disk longitudinally tripartite; respiratory and anal orifices on the right slightly anterior margin of the mantle; orifice of combined generative organs behind and below right eye-peduncle. Jaw smooth, with or without median projection. Lingual membrane with tricuspid centrals, bicuspid laterals, aculeate and bifid marginals.

Shell-plate internal, flattened, oval, very thin, a little convex, not spiral. *Africa.*

Differs from Parmarion in the anterior position of the respiratory orifice, and the want of a caudal horn-shaped process. Dendrolimax and Elisa, Heynemann, are synonyms.

### Genus PARMARION, Fischer, 1856.

Mantle adhering to the body by a small portion of its margin, with a large free anterior lobe enveloping the sides, and behind nearly the whole, of the shell, leaving a dorsal opening through which is seen the shell. Sole tripartite; foot truncate behind, with a mucous pore. Visceral mass convex behind and well separated from the foot. Marginal teeth bicuspidate.

Shell internal, calcareous, thin, oval, slightly convex, covered by a smooth epidermis which extends beyond the margin on the sides and posteriorly, enveloping the visceral mass.

Girasia, Gray, was described a little earlier, but was not well defined, and contained a mixture of other genera, Parmacella and Urocyclus. The true Parmarion is Asiatic.

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Subgenus PARMACOCHLEA, Smith, 1884.

Animal as in Parmarion. Shell almost concealed, flattened, oblong, having the nuclear portion in the form of a minute Sigaretus-like shell projecting from beneath.

Genus ASPIDELUS, Morelet, 1883.

Animal limaciform, posteriorly dorsally carinated with a caudal mucous pore; shield moderate, gibbous, with slightly free margin; pulmonary orifice at the middle of the right margin of the shield.

Shell external, mytiliform, not spiral. *W. Africa.*

Genus VITRINOZONITES, W. G. Binney, 1879.

Shell elongated, submembranaceous. Animal with round caudal mucous pore, bordered by a simple transversely grooved rim, covered completely when closed, when open the cover raised into a sharp carina. No appendiculate mantle-lobe. Marginal teeth unicuspid, instead of bicuspid, as in Vitrina (Pl. 29, fig. 10).

One species, mountains of *E. Tennessee and W. North Carolina.*

Genus VELIFERA, W. G. Binney, 1879.

Shell subglobose, smooth, shining. Animal furnished with accessory mantle processes covering most of the shell; mucous pore a simple slit, without horn-shaped process. Jaw smooth, inferiorly produced in the middle. Marginal teeth bifid (Pl. 29, fig. 11). 1 species. *Costa Rica.*

Genus HELICARION, Férussac, 1821.

Shell Vitriniform, rounded oval, thin and fragile, covered with a very thin epidermis; whorls few, rapidly increasing, the last much swollen; aperture large, with simple, sharp peristome.

Animal not entirely retractile within the shell; mantle produced in front into two lobes upon the neck, with a posterior lobe on the right side, partly covering the shell; foot truncate behind, with a dorsal projection and mucous pore, the sole longitudinally divided into three parts. Marginal teeth bicuspidate (Dentition, Pl. 29, fig. 12; jaw, Pl. 29, fig. 13.) More than

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sixty species have been described; they are inhabitants of warm countries, replacing the Vitrinas of the more temperate regions, and are found in *Southern and Eastern Asia*, *Malaysia*, *Philippines*, *Australia*, *Abyssinia*, etc.

Several sections have been proposed, founded mainly on characters of the animal. As in many of the species the animal is unknown, it is difficult to arrange the species in accordance with these sections.

Section CRYPTOSOMA, Theobald. Shell like Helicarion, but more robust. Animal capable of retraction within its shell; tail truncate; mucous pore large, without overhanging lobe; right shell-lobe of mantle moderately large, extending over the region of the body-whorl, and quite around to the posterior margin, where it unites with the left shell-lobe, which is very long and well developed, and spreads over the edge of the peristome from near the respiratory orifice. The right dorsal lobe is triangular in shape, and the left dorsal lobe is long and rather narrower than the shell-lobe adjacent. Jaw strong, straight in front, longitudinally striate. 1 sp. *Burmah.*

Section AUSTENIA, Nevill, 1878. Shell Vitrinoid, depressed; with fewer, more rapidly enlarging whorls than in typical Helicarion. The animal is somewhat slug-like in appearance, but with a well-formed shell. The shell-lobes ample. The right dorsal lobe extends from the respiratory orifice to the posterior right margin. The left dorsal lobe is large in front, and extends from the same part to the left margin. The shell-lobes are connected all around the periphery of the mantle-zone, but are reduced in size and present two distinct right and left contractile lobes; the right extends to and covers the apex of the shell, while the left extends over the edge of the body-whorl for a short distance, leaving the posterior and the greater portion of the upper surface of the shell uncovered. The posterior margin of the shell is not sunk in a depression of the hinder part of the foot, but the upper surface of the foot extends in an unbroken ridge to the mantle-zone. Extremity of the foot truncate, with a large linear mucous gland, with or without an overhanging lobe; the pedal line very distinct. The sole of the foot with a central separate area. *Southern Asia.*

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Section AFRICARION, Godwin-Austen, 1884. Shell like Helicarion. Animal with truncate tail and pore. The right shell-lobe is broad, extending towards the shell; it narrows posteriorly, and is continuous round to the left shell-lobe. The right dorsal lobe is small, but the left very ample and continuous. The ridge of the foot behind, just beneath the posterior margin of the shell, forks into two ridges, and this portion of the shell rests in the long triangular depression between them. Jaw with central inferior projection. *East Africa.*

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## Genus VITRINA, Drap., 1801.

### I. *Typical Species; mostly of northern regions.*

These are all small, fragile, inhabiting northern and temperate regions, where Helicarion does not occur. The larger frequently more solid species, which are inhabitants of warm countries and of the eastern hemisphere only, are in many cases not distinguishable by the shell alone from Helicarion, and as the animals of but few of the species have been examined, very little can be done towards a natural arrangement of the species. Doubtless species are admitted into either group which really belong to the other; and in order not to run the risk of making still more confusion, I am compelled to retain in Vitrina nearly all the species described under that name, unless removed to Helicarion by subsequent investigators.

#### Section SEMILIMAX, Stabile, 1859.

V. DIAPHANA, Drap. Pl. 30, figs. 77–86.

Shell thin, smooth, shining, diaphanous; greenish hyaline; whorls 2½, rapidly increasing, the last dilated; aperture almost horizontal, very large, the outer margin submembranaceous, the columellar margin somewhat curved. Diam. 6·5, alt. 3 mill.

*Germany, Switzerland, France, Sweden, England.*

The synonyms are numerous: *V. pellucida*, Voith; *Hyalina vitrea*, Studer; *Helix limacina*, Alten; *H. virescens*, Studer; *H. palliata*, Hartm.; *V. albina*, Ziegler. To these I add *V. Pego-*

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*rarii*, Pollonera (figs. 81–83), and *V. glacialis*, (Forbes?) Pollonera (figs. 84–86). A number of succeeding species might also be more usefully regarded as varieties only. *V. glacialis*, Forbes, has been variously identified; the short description will not permit a positive recognition. Pfeiffer considered it a syn. of *nivalis*. I have no hesitation in referring here Pollonera's figures of *glacialis*.

V. HEYNEMANNI, Koch. Pl. 30, figs. 87–90.

A little longer than the preceding species, with the sides not quite so convex. Diam. 6, alt. 3 mill.

*Germany.*

In form intermediate between *V. diaphana* and *V. elongata*. *V. lusatica*, Jordan (figs. 89, 90), appears to be identical.

V. NIVALIS, Charpentier. Pl. 30, figs. 91–99.

Somewhat smaller, with body-whorl somewhat more oblique than *V. diaphana*, subangulated at the periphery, upper part of outer lip not sinuous, only a little flattened in its curve.

Diam. 4·75 mill.

*Alps of Switzerland*, *Savoy* and *Northern Italy*.

*V. Charpentieri*, Stabile, and *V. alpestris*, Clessin, are synonyms.

Var. PINIANA, Pollonera. Pl. 30, figs. 94–99.

Slightly less convex above, with less prominent spire, and less oblique body-whorl and aperture than in the type. It forms one of a series of connecting links with *V. diaphana*. This form corresponds closely with what Pollonera considers the true *Charpentieri*; which he nevertheless considers a synonym of *nivalis*. Another step in the connecting series is *V. Villæ*, Pollonera (figs. 97–99).

V. PYRENAICA, Fér. Pl. 30, figs. 100, 1, 2.

Shining, hyaline-vitreous; whorls 2½, rapidly increasing, the last depressed; aperture horizontal, almost regularly oval, columella slightly arcuate. Diam. 6, alt. 2·3 mill.

Near *Pic du Midi*, *Pyrenees*.

Intermediate in form between *V. diaphana* and *V. elongata*, and *very* close to *V. Heynemanni*.

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V. ELONGATA, Drap. Pl. 30, figs. 3–5.

Much depressed, very thin, smooth, shining, yellowish hyaline; whorls scarcely 2, the last wide, the aperture wide, depressed, nearly horizontal. Diam. 4·3, alt. 1·3 mill.

*Germany, France, Catalonia.*

The synonymy includes *V. semilimax*, Fer.; *Testacella Germaniæ*, Oken; *Limacina vitrea*, β, Hartm.

V. BREVIS, Fer. Pl. 30, figs. 6, 7.

Depressed, thin, striatulate, shining, pellucid, greenish white; whorls 3, the last large; aperture oval, subtruncate.

Diam. 5·3, alt. 2·3 mill.

*Germany, Carinthia, Tyrol.*

Very similar to the preceding species, but shorter, and subtruncate on the outer margin. Pfeiffer and others at first considered it a variety of *V. elongata*—which it probably is. Böttger has recently described a variety *Bosniaca*, from Bosnia.

V. GÆOTIFORMIS, Pollonera. Pl. 30, figs. 8–11.

Depressed, elliptically auriform, slightly convex above, planulate below; colorless, whorls 2, rapidly increasing; aperture subhorizontal, oval, subtruncate in front, outer lip arcuate, columellar margin membranaceous, strongly arcuate, permitting a view of the spire. Length, 4·5 mill.

*Aosta, Savoy.*

Very distinct in its narrow columellar side, showing the volutions from below.

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*Unfigured Species.*

V. PENCHINATI, Bourg. *French Pyrenees; Spain.*

V. MEMBRANACEA, Koch. *Tyrolese Alps.*

Like *V. diaphana* but exceedingly thin and membranaceous.

V. TRUNCATA, Böttger (Allied to *V. brevis*). *Carniola.*

V. KOTULÆ, Westerlund (Allied to *V. elongata*). *Galicia.*

Section PHENACOLIMAX, Stabile, 1859.

V. PELLUCIDA, Müller. Pl. 30, figs. 12–16.

Subglobose, somewhat smooth, pellucid, greenish hyaline; whorls 3, rapidly enlarging, somewhat convex, the last wide and

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a little flattened below, suture wrinkled, aperture lunately rounded. Diam. 6, alt. 3·5 mill.

*Germany, Switzerland, N. Italy, France, England, Sweden, etc.*

The synonymy includes *Helix limacoides*, Alten; *Vitrina beryllina*, C. Pfr.; *V. Mülleri* and *Dillwynii*, Jeffreys; *Helix domestica*, Ström; *H. diaphana*, Poiret; *Vitrina subglobosa*, Mich.

Several varieties have been described, which are of but little importance. Among them are:—

Var. DILLWYNI, Jeffreys. Shell depressed globose, last whorl convex, spire elevated.

Var. MINOR, Westerlund. Shell small, depressed, thinner, hyaline, aperture rounded.

Var. BELLARDII, Pollonera (fig. 16). Shell more shining, flatter above, more convex below, smoother, minutely striulate at the suture.

The animal of *V. pellucida* is a favorite morsel with the hedge-hog; numerous fragments of the shells being found in its stomach. The food of the Glass-Snails, according to Dr. J. Gwyn Jeffreys (Brit. Conch., i, 156, 157) "is partly vegetable, consisting of Jungermanniæ and decayed leaves, and partly animal. I once saw no less than seven individuals of *V. pellucida* busily engaged in feeding on a scarcely dead earth-worm, which was faintly writhing about and endeavoring in vain to get rid of its tiny assailants. They have also been noticed eating horse-dung. They live in moist and shady places, but are seldom met with until late in the autumn. Their eggs are deposited in small heaps and have a membraneous covering. They are active and hardy creatures, and, whether crawling or at rest, seem always to keep the outer lobe of the mantle in motion so as to polish the shell. Bouchard-Chantereaux says that it does not begin laying its eggs until Sept.–Nov., and that the young attain their full growth in from eight to ten months. He believes it does not live longer than from twelve to fifteen months, having always found a number of dead individuals in January, after the close of the breeding season. Müller has noticed that it is most lively during rain, and that it does not soon die if put in water. He added that while it was under water it extended all its body

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except the tentacles, which were drawn in, and feigned death; that after the lapse of some hours it crept out of the water cautiously and by degrees, and if it was not alarmed by the observer it stretched out its horns, and after crawling into some place of shelter withdrew its body into the shell."

V. BAUDONI, Delaunay. Pl. 30, figs. 17–19.

Shell convex, subglobose, light greenish yellow, pellucid, crystalline, very shining; whorls 3½ to 4, the apex mamillary and not prominent; aperture rounded. Diam. 4–5, alt. 2–3 mill.

*Near Cherbourg, France.*

Prefers the seashore; appears after the autumn rains, and may be seen climbing on stones covered with snow. The animal is light violaceous, lighter on the sole, which is darker-margined. The shell is more globose and elevated, whorls more numerous, with a rounder aperture than *V. pellucida*.

V. GLOBOSA, Böttger. Pl. 30, figs. 20. 21.

Brownish, more globose, with 2½ rapidly increasing whorls, the last one more dilated than in *V. pellucida*.

Diam. 4, alt. 2·5 mill.

*Caucasia.*

V. GRUNERI, Pfr. Pl. 30, figs. 22–24.

Conoidally globose-depressed, very smooth, scarcely polished, olivaceous-corneous; suture white-margined; whorls 3½, a little flattened above, the last subdepressed, more convex below; aperture somewhat oblique, lunately oval, lip simple, the extremities approaching, the columellar lip arcuate, subinflected.

Diam. 8, alt. 5 mill.

*Arabia.*

V. ANGELICÆ, Beck. Pl. 30, fig. 25.

Convexly depressed, smooth, polished, pellucid, greenish yellow; spire small, subprominent, whorls 3½, rapidly increasing, the last broad below, suture lightly wrinkled; aperture oblique, lunate oval, lip subinflected, the columellar margin not receding and slightly arched. Diam. 6, alt. 3½ mill.

*Greenland, Labrador, Norway.*

Scarcely distinguished from *V. pellucida* by its aperture, and more rapidly increasing whorls.

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V. LIMPIDA, Gould. Pl. 30, figs. 26–28.

Depressed globose, thin, fragile, very smooth and shining, greenish hyaline; whorls 2½ to 3, slightly convex, the last large and much expanded, suture lightly impressed, sometimes with an impressed line revolving near it; aperture large, lunately rounded. Diam. 6, alt. 3 mill.

*Northern United States, Maine to N. W. of Lake Superior, and in Canada.*

Smoother, more globose, the aperture more rounded and more oblique than in *V. pellucida*—of which it may, nevertheless, prove a synonym. It is *V. Americana*, Pfeiffer.

V. PFEIFFERI, Newcomb. Pl. 30, fig. 29.

Moderately depressed, smooth, shining, pellucid, greenish white; whorls 3, the last large, suture very finely margined; aperture large, obliquely ovately rounded, lip thin, columella arched. Diam. 6·5, alt. 2·5 mill.

*California to Utah, southwards to New Mexico.*

More depressed and stouter than *V. limpida*, with less prominent spire than *V. Angelicæ*.

V. MAJOR, Fér. Pl. 31, figs. 30–40.

Depressed, thin, smooth, pellucid, very shining, hyaline greenish or greenish yellow; spire very short, the apex not prominent, suture lightly impressed, thread-margined; whorls 3½, rapidly increasing, the last depressed, somewhat lengthened, subplanulate below; aperture transversely lunar, somewhat oblique. Diam. 8, alt. 3·75 mill. *Middle Europe.*

Includes *V. Draparnaldi*, Cuv.; *V. diaphana*, Poiret; *Helix elliptica*, Brown; *Helicolimax Audebardi*, Fér.; *V. pellucida*, Drap.; *V. depressa*, Jeffreys; *V. Blanci*, Pollonera (figs. 33, 34).

Var. STABILEI, Lessona. Pl. 31, figs. 35–40.

Shell a little more depressed. Pollonera considers it a distinct species, and describes a variety of it as *Locardi* (figs. 38–40).

*Piedmont.*

V. COSTÆ, Paulucci. Pl. 31, figs. 41, 42.

Shell orbicularly subdepressed, fragile, yellowish or greenish, conspicuously striate at the suture; whorls 4, with crispate

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suture, the apex minute, the last whorl transversely dilated, scarcely descending; aperture transverse, large, the columellar margin arcuated, not reflected; umbilical region somewhat depressed. Diam. 7, alt. 4 mill.

*Mts. of Abruzzi, Italy.*

V. BONELLII, Targioni-Tozzetti. Pl. 31, figs. 43, 44.

Depressed, greenish yellow, whorls 3, very rapidly increasing, slightly striate, more distinctly so at the suture; aperture rounded ovate. Diam. 5, alt. 3·5 mill.

*Tuscany.*

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*Unfigured Species.*

| | |
|---|---|
| V. SERVAINIANA, St. Simon. | *Near Luchon, Pyrenees.* |
| V. CARNIOLICA, Böttger. | *Carniola.* |
| V. REITTERI, Böttger. | *Western Montenegro.* |
| V. BICOLOR, Westerlund. | *Switzerland, Pyrenees.* |
| V. AMPULLACEA, Jan. | *Sicily.* |
| V. HIEMALIS, Koch. | *Oetzthal, Tyrol.* |
| V. RUGULOSA, Koch. | *Turkestan.* |
| V. MEXICANA, Beck. Undescribed. | *Mexico.* |

Section OLIGOLIMAX, Fischer, 1878.

V. ANNULARIS, Studer. Pl. 31, figs. 45–48.

Depressly globose, rather smooth, thin, pellucid, somewhat shining, greenish hyaline; spire obtuse, whorls 3, moderately increasing, the last rounded, wide at base; aperture rounded oval, columellar margin short, subvertical; umbilicus perforate. Diam. 4, alt. 2·75 mill.

*Mts. Switzerland, France, Piedmont, Caucasus, Pyrenees.*

The synonyms are *Helix imputa*, Studer; *V. subglobosa*, Mich.; *V. æmulans*, Ad., and probably the unfigured *V. plicosa*, Bielz, of Transylvania.

V. KOMAROWI, Böttger. Pl. 31, figs. 49, 50.

Shell proportionally wider for its height, brownish instead of greenish, the spire more convexly conoidal, the whorls ($3\frac{1}{2}$) more slowly increasing, the embryonal whorl broader, the last whorl more descending than *V. annularis*.

Diam. 4·75, alt. 3·5 mill. *Caucasus.*



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V. Sieversi, Mousson. Pl. 31, fig. 51.

Minutely perforate, depressly convex, heliciform, very thin and fragile, pellucid, light corneous; spire convex, the apex small, obtuse; whorls 4, convex, with strong striæ near the suture, the last whorl large, depressed-rounded, smooth and more shining below; aperture round-oval, the lip slightly reflected at the umbilicus. Diam. 5·8, alt. 3·2 mill.

*Caucasus.*

The shell looks like a Helix, but the animal is said to be too large. Described as a Helicarion. It, as well as the preceding species, has been made a synonym of *V. annularis*, but they both appear to be very distinct from that species.

V. Paulucciæ, Fischer. Pl. 31, figs. 52, 53.

Very minutely perforate, orbicularly subglobose, thin, fragile, pellucid, scarcely shining; whorls 3½, convex, obliquely striate and obsoletely plicatulate; aperture oblique, transversely ovoid, the lip regularly arcuate, touching the perforation.

Diam. 3·5, alt. 2·3 mill.

*Aspromonte, Calabria.*

Very closely allied to *V. annularis*, perhaps identical with it.

V. rugosa, Paulucci. Pl. 31, figs. 54–56.

Very minutely perforated, rugose, orbicularly depressed, fragile, hyaline, light yellowish, strongly ribbed at the suture; whorls 3½, convex, rather rapidly increasing, the last wider, rounded, subcompressed in the middle, dilated at the aperture; aperture transversely ovate, the columellar margin lightly arcuated and reflected. Diam. 5, alt. 3 mill.

*Abruzzi, Italy.*

Probably only a variety of *V. annularis*.

V. Musignani, Mandralisca. Pl. 31, figs. 57–59.

Subglobose, pellucid, hyaline, thinly elegantly striate, whorls 3, the last subangulate, aperture rounded, spire a little exserted.

Diam. 4, alt. 2 mill.

*Sicily.*

This is also too closely allied to *V. annularis*.

V. exilis, Morelet. Pl. 31, figs. 60, 61.

Subperforate, rather convexly depressed, very thin, pellucid, hyaline, very lightly and distantly striate; suture impressed,

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margined; whorls 3, rapidly increasing, the last broad and flattened below; aperture obliquely oval, the termination of the peristome membraneous, that of the columella slightly reflected, giving the appearance of a punctiform perforation.

Diam. 7·5, alt. 3 mill.

*Kamtschatka, Alaska.*

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V. STRIATA, Bourg. Unfigured. *Ste. Baume, France.*

Section GALLANDIA, Bourg., 1880.

V. LEDERI, Böttger. Pl. 31, figs. 62, 63.

Umbilical region profoundly impressed, imperforate, rimate, shell depressed conical, very thin, fragile, pellucid, brownish yellow; whorls 3, rather rapidly increasing, with a subimbricated carina on the periphery of the last whorl, surface distinctly striate-costulate, smoother and more shining below.

Diam. 5, alt. 2·75 mill. *Caucasus.*

V. SUBCARINATA, Böttger.

Unfigured. Differs from *V. Lederi* in being larger, not rimate, the umbilical region less impressed, olivaceous brown or greenish, whorls 3½, a little more convex, not imbricated at the carina, which is less acute, the striæ denser and finer.

Diam. 5·75, alt. 4 mill.

*Talytsch, Caspian Region.*

V. CONOIDEA, Martens. Pl. 31, figs. 64–66.

Rimate, turbinate, rugosely striated, shining, olivaceous with a lighter suture, spire elevated; whorls 3½, regularly increasing, somewhat convex, the last subdepressed, planulate below, scarcely angulate at the periphery; aperture somewhat oblique, lunately rounded, the margins subapproximate, joined by a thin callus, columellar margin arcuate, very shortly reflected.

Diam. 4·5, alt. 4 mill.

*Turkestan.*

V. SUBCONICA, Böttger. Pl. 31, figs. 67, 68.

Lightly rimate, subturbinate, very thin, pellucid, light olivaceous brown; spire elevated, the apex small, excentric, mamillary; whorls 3, regularly finely striated, striæ stronger at the sutures, the periphery scarcely subangulated; aperture obliquely

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oval, the margins approaching, the columellar margin shortly reflected. Diam. 4, alt. 3 mill.

*Caucasia.*

II. *Species of the Canary and Madeiran Islands and Azores.*

V. LAMARCKII, Fér. Pl. 32, figs. 69–71.

Depressed, oval, smooth, thin, shining, yellowish corneous, sometimes slightly greenish, spire somewhat plane; whorls 2½, rapidly increasing; aperture large, subhorizontal, ear-shaped, outer margin arcuately dilated above, columellar margin widely membranaceous, base imperforate, but the aperture showing the spire. Diam. 15, alt. 5·5 mill.

*Canary Islands.*

*V. Teneriffæ*, Quoy, is a synonym.

V. RUIVENSIS, Couthouy. Pl. 32, figs. 72–74.

Haliotiform, transversely subquadrate-oval, depressed, papyraceous, pellucid, shining, greenish yellow; whorls 2 or 2½, flattened above, with slight suture; aperture very large, showing the spire. Diam. 13, alt. 4·5 mill.

*Madeira.*

*V. Lamarckii*, var., and *V. Behnii*, of Lowe, are synonyms.

V. BRUMALIS, Morelet. Pl. 32, figs. 81–83.

Depressed-auriform, almost membranaceous, very thin, pellucid, shining, greenish hyaline; spire plane, suture narrowly margined; whorls 3, rapidly increasing, the last depressed, large; aperture subhorizontal, showing the spire, the columellar border very narrow and almost wholly membranaceous. Diam. 9, alt. 4 mill.

*S. Miguel, Azores.*

V. BREVISPIRA, Morelet. Pl. 32, figs. 87, 88.

Differs from *V. brumalis*, in being a little smaller, the spire more minute and lateral, the whorls 2⅓ instead of 3, suture somewhat crenulated, columellar margin somewhat narrower and straighter. Diam 8, alt. 4 mill.

*Sta. Maria, and S. Miguel, Azores.*

V. MOLLIS, Morelet. Pl. 32, figs. 89–91.

A little larger than *V. brumalis*, more rounded in outline, the basal volution more rounded both above and below, surface

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smoother, color darker, aperture not so transverse, and the extremely membranaceous incurved columellar margin much wider, although permitting a view of the spire through the aperture. Diam. 10, alt. 5·5 mill.

*Terceira, Azores.*

V. FINITIMA, Morelet. Pl. 32, figs. 84–86.

Convexly depressed, auriform, very thin, shining, pellucid, smooth, greenish yellow; spire short, obtuse, plane, suture narrowly margined; whorls 2½, rapidly increasing, the last flatly rounded; aperture nearly horizontal, rounded-ovate, showing the spire; lip-margin distinctly thickened and slightly reflexed above, free and membranaceous below.

Diam. 8, alt. 3·5 mill.

*Flores, Azores.*

V. LATEBASIS, Mousson. Pl. 32, figs. 75–77.

Depressed, transversely oblong, thin, smooth, substriatulate, very shining, light yellowish green; spire plane, suture white-margined; whorls 2½, rapidly increasing, the last dilated; aperture large, oblique, subauriform, the lip incurved, callously covering the columellar region. Diam. 13, alt. 6·5 mill.

*Canary Islands.*

V. BLAUNERI, Shuttleworth. Pl. 32, figs. 78–80.

Depressed, transversely oblong, smooth, very shining, light yellowish green; spire plane, suture linear, margined; whorls 3, rapidly increasing; aperture oblong, oblique, margins approaching, slightly callous over the axis, and joined by a thin callus. Diam. 17, alt. 6 mill.

*Canary Islands.*

A little more solid and less transparent than the preceding species, with smaller aperture, and a small but appreciable lamellar dilatation of the peristome covering the axis, continued as a slight callus to the insertion of the upper lip.

V. CANARIENSIS, Mousson. Pl. 32, figs. 92–94.

Globosely depressed, oval, very smooth and shining, pellucid, greenish corneous; spire slightly convex, with linear, not distinctly margined suture; whorls 3, rapidly increasing, the last large but not dilated; aperture diagonal, widely ovate, oblique.

Diam. 11, alt. 5·5 mill.

*Canary Islands.*

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V. RETICULATA, Mousson. Pl. 32, figs. 95–97.

Depressed, thin, subdiaphanous, thinly but distinctly striate, elegantly reticulated by slight decurrent lines, greenish or light purplish corneous; spire minute, suture not margined; whorls $2\frac{1}{2}$, rapidly increasing, subdepressed, more convex below; aperture oblique, widely oval, margins approximating.

Diam. 8, alt. 3·5 mill.

*Teneriffe.*

V. MARCIDA, Gould. Pl. 32, figs. 98–100.

Depressed sigaretiform, shining, fragile, brownish green; apex subcentral, suture impressed; whorls 3, the last subplanate; aperture lunately auriform. Diam. 5–7, alt. 2–3 mill.

*Madeiran Group.*

*V. media*, Lowe, is a synonym. Wollaston doubts its distinctness from the next species; he finds it usually smaller, however, of paler color, more depressed spire and less inflated body-whorl, the lower lip more broadly membranaceous. It has usually half a volution less than *V. nitida*, with slight indications of short radiating plicæ at the suture and towards the aperture.

V. NITIDA, Gould. Pl. 32, figs. 1, 2.

Depressed, very thin, irregularly very slightly striulate, pellucid, very shining, greenish yellow; spire scarcely elevated, suture distinct, subimpressed; whorls $3\frac{1}{2}$, rapidly increasing, the last rather wide below; aperture widely oval, oblique, columellar margin submembranaceous. Diam. 15, alt. 7 mill.

*Madeira.*

It is *V. Lamarckii*, of Lowe, in part. See remarks under preceding species.

V. ANGULOSA, Morelet. Pl. 32, figs. 3–5.

Conoidly depressed above, more rounded below, very thin, diaphanous, reddish green; spire obtuse, suture distinctly margined; whorls 3, rapidly increasing, the last angulate; aperture ovately subangular, oblique, the lower margin membranaceous.

Diam. 6, alt. 3 mill.

*Sta. Maria, Azores.*

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V. PELAGICA, Morelet. Pl. 32, figs. 6–8.

Rather solid, shining, pellucid, smooth, greenish yellow; spire convex, suture linear, marginate; whorls 3, rapidly increasing; aperture obliquely oval, the margin slightly thickened, the extremities approximating, joined by a thin callus, the columellar margin narrowly expanded and subreflexed, with a very minute fosset or chink between it and the base. Diam. 8, alt. 4 mill.

*Sta. Maria, Azores.*

V. LAXATA, Morelet. Pl. 32, figs. 9–11.

Oblong-ovate, depressed, very thin, subrugulose, shining, hyaline, greenish yellow; suture rugulosely margined; whorls 3½, rapidly increasing, the last large, dilated, elongated transversely; aperture obliquely transversely oval, superior margin slightly arcuate, the inferior not membranaceous, a little thickened. Diam. 12, alt. 6 mill.

*Sta. Maria and S. Miguel, Azores.*

Var. β, more globose and more solid.

V. FASCIOLATA, Fér. Pl. 32, figs. 12, 13.

Depressed, transversely oblong, thin, yellowish green, with two red revolving lines, and two more on the base of the body-whorl; whorls 3, rapidly enlarging; aperture lunately oval. Diam. 16 mill.

*Teneriffe?*

Evidently does not belong to this fauna, modern naturalists having failed to obtain it in either of the groups.

### III. *West African Species.*

V. WELWITSCHII, Morelet. Pl. 33, figs. 14–16.

Imperforate, subdepressed and plicately striate above, not shining, yellowish brown, smooth, shining and olivaceous below; suture distinct but not margined; whorls 4; the last large and compressed at the periphery; aperture somewhat oblique, the lip membranaceous-margined. Diam. 33, alt. 20 mill.

*Angola, W. Africa.*

*V. Angasi*, H. Adams (fig. 16) is a synonym; it was nominally published in the same year, but Morelet has shown conclusively that his was the earlier publication.

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V. SOWERBYANA, Pfr. Pl. 33, figs. 17–19.

Shell depressed, subauriform, arcuately plicatulate, very thin, pellucid, reddish brown; suture deeply impressed; whorls 3, the last depressed, flattened above, the periphery angulated, the base convex; aperture large, oblique, lunately oval, the columellar margin narrowly membranaceous. Diam. 22, alt. 11 mill.

*W. Africa.*

V. GOMESIANA, Morelet. Pl. 33, figs. 20–22.

More lenticular, the body-whorl not so obliquely flattened above, and less convex below than in *V. Sowerbyana*, the whorls also less rapidly enlarging, and the color more yellowish.

Diam. 20, alt. 8 mill. *Angola, W. Africa.*

V. AMŒNA, Morelet. Pl. 33, figs. 23, 24.

Shell much depressed and striate above, more convex, smooth and shining below, compressed at the periphery, suture impressed, lightly but distinctly marginate; yellowish with a broad chestnut fascia on the upper surface; columellar lip widely membranaceous-margined. Diam. 25, alt. 9 mill.

*Angola, W. Africa.*

V. GRANDIS, Beck. Pl. 33, figs. 25–27.

Rather thin, lightly radiately plicatulate, diaphanous, not shining; yellowish white; whorls 3½, moderately enlarging, subplanate, the last depressed, periphery obsoletely angulated, base wide, striatulate, shining. Diam. 18, alt. 8 mill.

*Senegal.*

*Helicophanta formosa*, Jonas (in litt.) is quoted as a synonym by Pfeiffer. The specific name is singularly inappropriate, in view of the giant forms which have been characterized since its publication.

V. SIGARETINA, Recluz. Pl. 33, figs. 28–30.

Shell almost plane above, thin, with arcuate striæ, shining, pellucid, yellowish green, suture lightly impressed; whorls less than 3, rapidly enlarging, the body-whorl depressed, not angulated, a little more convex below—where it is membraneous margined; aperture oblique, transverse, oval-lunate, the columellar lip receding, arcuate. Diam. 16, alt. 7 mill.

*Sedion, Casamanza River, Senegambia.*

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V. ANGOLENSIS, Morelet. Pl. 33, figs. 31–33.

Depressed globose, thin, subrugulose, radiately plicatulate at the suture, diaphanous, scarcely shining, brownish yellow; spire conoidally depressed, suture margined; whorls scarcely 4, the last depressed rounded, shining below; aperture oblique, lunately-rounded, the columellar margin very shortly reflected at its insertion, forming a narrow slit. Diam. 17, alt. 9 mill.

*Angola.*

V. CORNEOLA, Morelet. Pl. 33, figs. 34–36.

Depressed globose, thin, inconspicuously striate, not shining, diaphanous, orange-brown; spire depressed-conoidal, suture very narrowly margined; whorls 3½, the last lightly compressed at the periphery; aperture oblique, lunately-rounded, columellar margin very narrowly dilated and reflected at its insertion.

Diam. 8, alt. 4 mill.

*Angola, W. Africa.*

V. DUMETICOLA, Dohrn. Pl. 33, figs. 37–39.

Depressed globose, very thin, lightly striate, very shining, vitreous horn-color; whorls 3, rapidly enlarging, the last rounded, slightly more convex below; aperture oblique, lunately rounded, partly showing the whorls. Diam. 9, alt. 5·75 mill.

*Prince's Isl., Gulf of Guinea.*

## IV. *East and South African Species.*

V. SENNAARIENSIS, Pfr. Pl. 33, figs. 40–42.

Turbinately depressed, thin, obliquely rugosely striate, somewhat shining, pellucid, corneous-green, usually dark stained; spire subturbinate, mucronate, suture deeply impressed; whorls 3, convex, the last obliquely flattened, and obsoletely angulate on the periphery; lip thin, subinflected above.

Diam. 6·6, alt. 3 mill.

*Sennaar, Nubia.*

V. DARNAUDI, Pfr. Pl. 33, figs. 43, 44.

Depressed globose, rather thin, irregularly striulate, somewhat shining, light greenish corneous; spire convex, obtuse, suture narrowly margined; whorls scarcely 3, convex, rapidly enlarging;

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aperture subdiagonal, lunately oval, lip slightly inflected, the columellar margin narrowly membranaceous.

Diam. 16, alt. 7·5 mill.

*Sennaar, Nubia.*

Is this a not completely grown *V. hians*?

V. HIANS, Rüppell. Pl. 33, figs. 45–47; Pl. 34, figs. 50–52.

Depressed globose, thin, striulate, pellucid, somewhat shining, light corneous, with radiating darker streaks, suture impressed, margined; whorls 4, rapidly increasing, the last rounded.

Diam. 24, alt. 12 mill.

*Abyssinia.*

*V. Rüppelliana*, Pfr. (figs. 45–47), appears to be a younger state of this species; *V. Darnaudi* (above) is probably a still younger form.

V. JICKELII, Krauss. Pl. 33, figs. 48, 49.

Subglobose, thin, shining, striate, yellowish brown; spire slightly convex, the apex planulate, suture slightly narrowly margined; whorls less than 3, rapidly increasing, the last globose, slightly descending in front; peristome narrowly membraneous. Diam. 11·75, alt. 8 mill.

*Abyssinia.*

Perhaps the young of the next species.

V. ISSELI, Morelet. Pl. 34, figs. 56–58.

Globosely depressed, thin, pellucid, irregularly striulate, yellowish green, suture narrowly margined; whorls 3½, rapidly enlarging, the last large, depressly rounded, more convex below; columellar margin almost membraneous. Diam. 15, alt. 8 mill.

*Abyssinia.*

V. SEMIRUGATA, Jickeli. Pl. 34, figs. 53–55.

Depressed globose, thin, diaphanous, somewhat shining, rugose, yellowish-brown; spire small, with minute, submamillary apex, suture slightly thread-margined; whorls 4, rapidly enlarging, the last rounded, slightly descending in front; lip membraneous below, reflected at the columellar insertion, forming a slit.

Diam. 15·75, alt. 9·5 mill.

*Abyssinia.*

V. CAILLIAUDI, Morelet. Pl. 34, figs. 59–67.

Depressed, thin, thinly and lightly striated, shining, pellucid, orange-brown; spire planulate, the impressed suture narrowly

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margined; whorls 3½, rapidly enlarging, the last more convex below; aperture with subparallel margins, the columellar margin membraneous. Diam. 17, alt. 8 mill.

*Abyssinia.*

This is *V. Martensi*, Jickeli, and *V. Isseli*, var., of the same author, not Morelet. Jickeli also considers his *V. planulata* a synonym (figs. 62–64) and his *V. devexa* (figs. 65–67) a variety.

V. MAMILLATA, Martens. Pl. 34, figs. 68–70.

Depressed, thin, unequally arcuately striate, shining, yellowish green, suture brown-margined; whorls 3½, rapidly increasing; aperture lunately ovate, the outer margin slightly sinuous above, the columellar margin membraneous. Diam. 16, alt. 8 mill.

*Abyssinia.*

Very close to *V. Isseli*, Morelet.

V. HELICOIDEA, Jickeli. Pl. 34, figs. 71–73.

Subglobose, thin, slightly striate, pellucid, yellowish, a little shining; suture impressed, thread-margined; whorls 3½, convex, rapidly increasing, the last descending, subplanulate above, more convex below; lip thin, margined within, slightly membraneous. Diam. 9·75, alt. 6·75 mill. *Abyssinia.*

V. MILNE-EDWARDSIANA, Bourg. Pl. 34, figs. 74–76.

Oblong semiglobose, thin, shining, diaphanous, imperforate, striated, striæ subpliciform on the last whorl, with slightly perceptible dents in spiral series; yellowish; whorls 3, with submargined suture, the last large, obliquely flattened, more convex below; lip very fragile, reflected at the columellar insertion. Diam. 15, alt. 12 mill.

*Mts. of Abyssinia.*

V. RAFFRAYI, Bourg. Pl. 34, figs. 77–79.

Depressed globose, imperforate, very thin, diaphanous, very shining, smoky fawn-color, smooth, subplicate at the suture of the last whorl; whorls 3½, the suture becoming submargined in the last, which is a little obliquely flattened above and more convex below; lip thin, slightly reflected at the columellar insertion. Diam. 9, alt. 6 mill.

*Mts. of Abyssinia.*

The shell is entirely membraneous, and so elastic that it may be pressed together by the fingers and flattened, resuming the normal form when the pressure is removed.

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V. HERBINI, Bourg. Pl. 34, figs. 80–82.

Imperforate, semiglobose, very thin, diaphanous, chestnut fawn-color, shining, smooth or very finely striated if viewed with a lens; whorls 3, rapidly enlarging, the last submarginate; columellar lip reflected above, forming an umbilical callus.

Diam. 10, alt. 7 mill.

*Mts. of Abyssinia.*

V. NATALENSIS, Krauss. Pl. 34, figs. 83–84.

Depressed globose, thin, smooth, pellucid, olivaceous-corneous, with a single chestnut line above the periphery; whorls 4½–5, the last excavated around the imperforate axis; columella callous above, outer lip subinflected. Diam. 19, alt. 12 mill.

*Natal, So. Africa.*

V. PÖPPIGI, Menke. Pl. 34, figs. 85–87.

Subglobose, imperforate, very thin, striulate, shining, pellucid, yellowish horn-color, with a chestnut line above the periphery; whorls 4, suture submargined. Diam. 10·5, alt. 7 mill.

*Natal, So. Africa.*

Smaller and more globose than the preceding species.

V. TRANSVAALENSIS, Craven. Pl. 34, figs. 88, 89.

Globular, imperforate, hyaline, semitransparent, fragile, glossy, amber-colored; whorls 3½–4, very convex, rapidly increasing, last whorl faintly striated, and slightly puckered at the linear suture.

Diam. 10·5, alt. 8·5 mill.

*Leydenburg, Transvaal.*

More globular, and without the colored band of the last species.

V. VANDENBROECKII, Craven. Pl. 34, figs. 90, 91.

Oblong, vitreous, depressed, somewhat flattened and dull above, more convex and glossy below, pale yellow, apex, suture and margin of aperture dark amber; whorls 3½, rapidly enlarging, the last very large, with deep, puckered suture.

Diam. 14·5, alt. 10 mill.

*Leydenburg, Transvaal.*

Except in the want of chestnut-margined suture this is very like *V. pellicula*, Fér.

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V. CORNEA, Pfr. Pl. 34, figs. 92–94.

Globosely depressed, very thin, striulate, pellucid, light corneous; whorls 4, the last wide, subdepressed; aperture obliquely lunar, columellar lip shorly reflected-appressed above.

Diam. 16, alt. 9 mill.

*Natal, So. Africa.*

Var. $\beta$, with a chestnut line on the periphery.

V. PLANTI, Pfr.

Depressed above, very thin, smooth, pellucid, very shining, yellowish hyaline; spire plane, suture submargined; whorls not 3, flattened, the last large, inflated below, membraneously margined. Diam. 12, alt. 6 mill.

*Natal, So. Africa.*

Unfigured. Differs from the other species by its nearly plane spire.

V. PELLICULA, Fér. Pl. 34, figs. 95, 96.

Depressed globose, thin, diaphanous, yellowish white, with the suture narrowly chestnut-margined; whorls $3\frac{1}{2}$–4, the last somewhat inflated; aperture lunate-rounded.

Diam. 13, alt. 9 mill.

*Cape of Good Hope.*

V. MADAGASCARIENSIS, E. A. Smith. Pl. 35, figs. 100, 1.

Imperforate, depressed, very thin, diaphanous, pale greenish yellow, the suture and upper part of the outer lip stained brownish, brilliantly glossy; whorls $3\frac{1}{2}$, suture margined, first whorl microscopically decussated, body-whorl large with distinct growth-lines, here and there subplicate, lower surface with indications of interrupted concentric striæ; lower part of aperture-margin thin, wrinkled. Diam. 15·5, alt. 9 mill.

*Betsileo, Madagascar.*

V. BORBONICA, Morelet. Pl. 34, figs. 97–99.

Depressed, transversely oblong, thin, diaphanous, shining, greenish yellow, very lightly striate and inconspicuously decussated; whorls $3\frac{1}{2}$, suture margined, last whorl large, dilated; columellar lip narrowly membraneous, reflected above, forming a narrow slit over the umbilical region. Diam. 11, alt. 5 mill.

*Isle of Bourbon.*

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V. COMORENSIS, Pfr. Pl. 35, fig. 2.

Globose, thin, rugosely striate, diaphanous, barely shining, greenish corneous with dots and strigations of yellowish; whorls 3, the last inflated; aperture somewhat pearly, variegated with white. Diam. and alt. about 20 mill.

*Ins. Mayotte, Comoro Is.*

Very much resembling *Helix aperta*, Born.

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V. CONQUISITA, Jickeli (unfigured). *N. E. Africa.*
V. RIEPIANA, Jickeli (unfigured). *Abyssinia.*
V. ABYSSINICA, Rüppell (unfigured). *Abyssinia.*
V. PEROBLIQUA, Innes (unfigured). *Abyssinia.*

## V. *Polynesian Species.*

V. SUBVIRIDIS, Pease. Pl. 35, figs. 3–5.

Imperforate, very thin, fragile, pellucid, smooth, vitreous, suborbicular, greenish yellow; whorls 4, suture distinct; aperture rounded-oval. Diam. 10, alt. 7 mill.

*Marquesas Is.*

V. FUSCA, Pease. Pl. 35, figs. 6–8.

Thin, pellucid, shining, smooth, fuscous-olivaceous, suborbicular; whorls 4, with impressed suture; aperture rounded-oval. Diam. 10, alt. 7 mill.

*Marquesas Is.*

Besides the difference in color, the spire is more prominent than in the preceding species.

V. ULTIMA, Mousson. Pl. 35, figs. 9, 10.

Imperforate, depressed above, convex below, thin, very shining, pellucid, amber-colored, very slightly striate; whorls $3\frac{1}{2}$, rapidly enlarging, the last large; aperture obliquely oval, columellar margin membraneous. Diam. 9, alt. 4·6 mill.

*Sunday Island, Kermandec Archipelago.*

*V. Kermandecensis*, Smith (unfigured), is a synonym.

V. FASCIATA, Souleyet. Pl. 35, figs. 26, 27.

Shell somewhat auriform, very thin, pellucid, yellowish;

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whorls 3, last whorl narrow below; aperture large, ovate, showing the spire. Diam. 11, alt. 4 mill.

*Philippines.*

Said to resemble *V. Teneriffæ*, Quoy, of the Canary Islands. The drawing of the animal shows fasciations on the flanks; there is no mucous pore.

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V. AUREA, Pfr. Unfigured. *Solomon's Islands.*

V. FUMOSA, Pfr. Unfigured. *Habitat unknown.*

## Genus VITRINOIDEA, Semper, 1873.

V. ALBAJENSIS, Semper. Pl. 35, fig. 11.

Shell globosely depressed, very thin, with horny cuticle and very thin calcareous structure; whorls 3½.

*Isl. of Albay, Philippines.*

The single specimen was broken in transmission so that a complete diagnosis could not be given.

## Genus LACONIA, Gray, 1855.

L. FÉRUSSACI, Gray. Pl. 35, figs. 12, 13.

This animal and its shell are only known by a figure in Férussac's Hist. des Mollusques. The shell appears to be entirely covered by the mantle, and Vitrinoid in character.

*Habitat unknown.*

## Genus VITRINOPSIS, Semper, 1873.

V. TUBERCULATA, Semper. Pl. 35, fig. 14.

Shell membranaceous, flat, with 2 whorls, aperture horizontal.

*Bohol, Philippines.*

Described from a single specimen.

V. TIGRINA, Semper. Pl. 35, figs. 15, 16.

Shell somewhat more solid than the preceding species, whorls 2, flattened, aperture horizontal, lip sharp. Diam. 7 mill.

*Near Manilla, Philippines.*

Described from a single specimen. The shell was broken in extracting it from the mantle-lobes. The name is from tiger-like black and yellow markings on these lobes.

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## Genus PARMELLA, H. Adams, 1867.

P. PLANATA, H. Adams. Pl. 35, fig 17.

Shell haliotiform, very thin, polished, epidermis yellowish brown, widely extending beyond the margin, subplicate with growth-lines; spire very minute, plane, suture distinct; whorls 3, rapidly enlarging; aperture subhorizontal, showing the spire.

Diam. 15 mill. (without epidermis).

*Fiji Islands.*

Animal unknown.

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P. ELONGATA, Dohrn. Unfigured. *Sumatra.*

## Genus VITRINOCONUS, Semper, 1873.

V. CYATHELLUS, Pfr. Pl. 35, figs. 18, 19.

Umbilicated, conical, obliquely costate, rather thin, corneous; whorls 9, filiformly carinate; lip slightly reflected at the base.

Diam. 5·3, alt. 4 mill.

*Isl. Panay, Philippines.*

V. CYATHUS, Pfr. Pl. 35, figs. 20, 21.

Umbilicated, arcuately ribbed-striate, brownish, suture crenulately margined; whorls 6½, the last carinate, smoothish and flattened on the base, umbilicus large. Diam. 8, alt. 4·5 mill.

*Ins. Luzon, Philippines.*

V. SINAITENSIS, Pfr. Pl. 35, fig. 22.

Widely umbilicated, thin, closely striated, brown; whorls 7, with a filiformly carinate periphery, base somewhat convex.

Diam. 10, alt. 4 mill.

*Sinait, province of Ilocos, Luzon, Philippines.*

V. DOLIOLUM, Pfr. Pl. 35, fig. 23.

Perforate, turbinate, closely, minutely costulate-striate, pellucid, not shining, brown; whorls 5, slightly convex.

Diam. 3·5, alt. 2·5 mill.

*Sibonga, Isl. Zebu, Philippines.*

V. SCALARINUS, Pfr. Pl. 35, fig. 24.

Imperforate, striulate, thin, hyaline; whorls 6, the last with acutely carinated periphery, base a little convex, lightly, very minutely concentrically striate. Diam. 5, alt. 5 mill.

*Ins. Leyte, Philippines.*

It is *Helix gradata*, Pfr., not Gould.

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V. TONGANUS, Quoy. Pl. 35, fig. 25.

Imperforate, striulate, fragile, pellucid, carinate, whitish corneous; whorls 6, the last subimpressed at the base.

Diam. 7, alt. 5 mill.

*Ins. Tonga Taboo* (Quoy); *Ins. Negros, Philippines* (Cuming).

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V. DISCOIDEUS and V. TURRITUS, Semper. Unfigured.

*Ins. Luzon, Philippines.*

## Genus PLUTONIA, Stabile, 1864.

P. ATLANTICA, Morelet and Drouet. Pl. 35, fig. 28; Pl. 29, figs. 75, 76.

Animal reddish brown or chocolate-color; mantle finely shagreened, lighter colored over the shell, sometimes with large patches of bluish color, neck with yellowish blotches on either side, sole sepia-colored with minute dark spots. Length, 1 inch.

Shell ancyliform, oblong, planate, somewhat rugose, longitudinally costulate, brownish; spire short, lateral, posterior, apex whitish.

*San Miguel, Azores.*

## Genus TRIGONOCHLAMYS, Böttger, 1881.

T. IMITATRIX, Böttger. Pl. 35, fig. 29.

Animal blackish above, sole ash-colored in the middle, blackish on the sides. Length, 3–4 inches.

*Caucasus.*

### Subgenus PSEUDOMILAX, Böttger, 1881.

T. LEDERI, Böttger. Pl. 35, figs. 30, 31.

Whole animal blackish. Length, 23 mill.

*Kutais, Transcaucasia.*

T. BICOLOR, Böttger. Pl. 36, figs. 38, 39.

Animal blackish above, the carina and margins of the shield lighter, sole yellowish. Length, 4·5 mill.

*Lenkoran, Caspian Sea.*

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T. RETOWSKI, Böttger. Unfigured. *Caucasus.*



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sunken lines. Margin of the foot with a series of small black specks. *Near the mouth of Zambesi River, Central Africa.*

U. FLAVESCENS, Keferstein. Pl. 35, figs. 34–36.

Grayish brown to dark orange, keel and lateral ridges lemon, sulci dusky. Shell very pale yellowish.

Length, 1 inch contracted, or 3 inches when in motion.

*Mozambique.*

Var. PALLIDA, Gibbons. Shield and body opaque white, with a faint yellowish tinge.

The variety and type are found on bushes. Ordinarily the shell is invisible, the longitudinal slit in the shield being closed, but the animal has the power of dilating it so as to show the shell.

U. COMORENSIS, Fischer. Pl. 36, figs. 47, 48.

Animal, discolored by alcohol, apparently without color marking. Shell extremely fragile, composed of a thin calcareous plate with an epidermis which extends beyond its margin anteriorly and laterally. Length, 60 mill.

*Ins. Mayotte, Comoro Is.*

U. VITTATUS, Fischer. Pl. 36, fig. 49.

Animal, discolored by alcohol but showing a dark stripe on either side of the granular mantle, the centre marbled. Smaller and narrower than the preceding species and less carinated behind, the mucous pore is smaller, the dorsal slit less posterior, the mantle granular. Shell not described. Length, 42 mill.

*Ins. Mayotte, Comoro Is.*

U. LONGICAUDA, Fischer. Pl. 36, figs. 50, 51.

Yellowish, unicolored or maculated with black; shield very small, granulated, with the posterior slit very small; tail narrow, with small pore. Length, 50 mill.

Shell small, oval, thin, concentrically striated, nucleus in the posterior centre, somewhat prominent.

*Ins. Nossi-Comba near Madagascar.*

U. BUCHHOLZI, Martens. Pl. 36, fig. 52.

Greenish, marbled with a darker tint, especially on the shield, margin of the foot whitish. Length, 72 mill.

*Aburi, Gold Coast, W. Africa.*

The figure was made from a colored drawing; no description published.

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U. HEYNEMANNI, Dohrn. Pl. 36, figs. 53, 54.

White, rarely citron-yellow, mantle smooth. Shell very thin, almost entirely epidermal, with growth-lines, olivaceous-yellow; the calcareous portion very fragile, crystalline.

Length of animal, 80–90 mill.; contracted in alcohol (as in figure) to 36 mill.

*Prince's Isl., W. Africa.*

The type of the genus Dendrolimax, Heynemann.

U. BELLA, Heynemann. Pl. 36, figs. 55, 56.

Brownish, more or less flecked or spotted with darker brown, rarely with black. Length, 50 mill.

*Madagascar.*

Type of the genus Elisa, Heynemann.

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*Unfigured Species.*

U. FASCIATUS, Martens. *Mozambique.*

U. MARTENSI, Heynemann. *East Africa.*

Although from a very distant locality, the author of this species subsequently considered it a probable variety or synonym of *U. Buchholzi*, of W. Africa.

## Genus PARMARION, Fischer, 1856.

P. CROCEUS, Godwin-Austen. Pl. 37, figs. 59–61.

Shell flat, rudimentary, narrowly oblong, thin, corneous, transparent, light yellowish green with darker green rays, apex a little curved, peristome membranaceous, very thin, transparent, light milky white within. Length 19, width 9 mill.

*Cherra Poongee, India.*

"These mollusks are abundant during the rainy season, but are hard to discover in the cold weather, and only then under stones and logs in damp low situations. In July I found *P. croceus* very plentiful just above Teria Ghat, and I observed them when I was hunting for butterflies, crawling about over the tall grasses 12 feet from the ground."—(Godwin-Austen.)

P. SHILLONGENSIS, Godwin-Austen. Pl. 37, fig. 62.

Shell corneous, long and narrow, thin, light greenish.

Length 19, width 7 mill.

*Shillong and North Khasi Hills, India.*

Animal ochraceous or umber-brown, not variegated.

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Var. BRUNNEUS, Godwin-Austen.

Shell as in the last description.

Animal brown, with parallel dark sepia streaks on the mantle, and margin of foot.

*Shillong, Khasi Hills, India.*

P. RADHA, Godwin-Austen. Pl. 37, fig. 66.

Shell similar to that of *P. Shillongensis*. Animal rich ochre color, sparsely dappled with gray-black on the mantle and tail.

*Assam.*

P. NAGAENSIS, Godwin-Austen. Pl. 37, fig. 63.

Shell ovate, very thin and fragile.

Length 22·5, width 13·75 mill.

*Naga Hills, India.*

Animal ochraceous, mottled and dotted with a darker shade.

P. BURTII, Godwin-Austen. Pl. 37, fig. 67.

Shell dull white, very horny in texture, the apex scarcely developed, outline rounded above. Diam. 7·5 mill.

*Assam.*

? P. RUBRUM, Godwin-Austen. Pl. 37, figs. 64, 65.

Shell quite rudimentary, minute, granular. Length, 3·5 mill.

Animal orange-pink, gray on under side of foot; with three longitudinal parallel greenish gray bands on the neck.

*Naga Hills, India.*

P. CINEREUS, Godwin-Austen. Pl. 37, fig. 68.

Shell not described. Animal dusky gray, mantle with a papillated surface slightly spotted, the spotting being coarser on the body and tail.

*On Darpang River, Dafla Hills, Assam.*

P. HOOKERI, Gray. Pl. 37, fig. 69.

Shell oblong, elongate, slender, arched concentrically, very thin, horny, wrinkled; thicker but equally horny, in the upper part of the centre; the apex thick, white, solid, suboblong, elongate ear-shaped, with a lateral submarginal spire of half a whorl. Diam. maj. 14 mill.

*Khasi Hills, India.*

*P. Theobaldi*, Austen, is a synonym.

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P. EXTRANEUS, Férussac. Pl. 37, fig. 70.

The shell is said to be "a thin horny pellicle without any appearance of a spire." The figure which I give from Semper appears similar to that of Férussac, but drawn with more attention to detail; it is taken from a specimen received from Calcutta. Godwin-Austen, however, doubts both the identification and its locality, unless it may have been imported into the Botanical Gardens there, with plants. Férussac gives no locality.

P. PUPILLARIS, Humbert. Pl. 37, figs. 71–74.

Shell calcareous, thin, oval, wider and less rounded anteriorly, slightly convex, feebly striate by growth-lines; the amber-colored epidermis extends beyond the shell, covering the visceral mass.

*Java.*

Dr. von Martens describes three varieties of coloration:—

Var. PUNCTATA. Mantle brownish gray, head and neck blackish, sides of the foot with small indistinct round spots, sole lighter through the middle.

Var. MARMORATA. Mantle light brown marbled with reddish brown, sides of the foot more grayish with a darker fine reticulation.

Var. VITTATA. Reddish gray-brown, with dark lines directed rearwards from the base of the tentacles two hook-like dark markings on the anterior part of the mantle, two dark lines towards the tail.

This is possibly the same as the next species. *P. punctatus*, Hasselt, is a synonym.

P. PROBLEMATICUS, Férussac. Pl. 37, figs. 49, 50.

Only known through Férussac's figures. No locality given. It may be the young of the preceding species.

P. BECCARII, Issel. Pl. 37, figs. 51, 52.

Shell roundly oval, slightly convex, membraneous, pellucid, shining yellowish green.

Animal with unequal polygonal tubercles, grayish brown, with small maculations on the minutely granular mantle.

*Borneo.*

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P. Doriæ, Issel. Pl. 37, figs. 53, 54.

Shell brownish.

Animal brownish, unequally polygonally tuberculate, with small black maculations, mantle granular.

*Borneo.*

Probably only a variety of the preceding species.

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*Unfigured Species.*

P. Kersteini, Martens. *East Africa.*

P. tæniatus and P. reticulatus, Hasselt. *Java.*

P. luteus and P. planus, Martens. *Java.*

P. Rangianus, Fér. *I. Bourbon, Madagascar.*

Subgenus Parmacochlea, Smith, 1884.

P. Fischeri, Smith. Pl. 37, figs. 55–58.

Shell yellowish brown. Length 7, diam. 4 mill.

*Cape York, N. Australia.*

*Vitrina australis*, Reeve, is suspiciously like this species.

Genus ASPIDELUS, Morelet, 1883.

A. Chaperi, Morelet. Pl. 36, figs. 57, 58.

Obscure reddish brown, with darker variegations, becoming darker towards the tail. Shell very thin, shining, yellowish, covering about two-thirds of the shield.

Length of animal in alcohol, 26 mill.; length of shell, 6·5 mill.

*Assiniam, Gulf of Guinea, W. Africa.*

Genus VITRINOZONITES, W. G. Binney, 1879.

V. latissimus, Lewis. Pl. 36, figs. 62, 63; Pl. 29, fig. 72

Depressed, oblong, thin, fragile, translucent, shining; whorls 3, rapidly increasing, with growth-lines and a few microscopic revolving lines; last whorl very large, depressed above, more convex below, imperforate; aperture widely oval, lip membraneous; smoky brown. Diam. 17, alt. 7 mill.

*Mts. E. Tennessee, W. No. Carolina.*

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## Genus VELIFERA, W. G. Binney, 1879.

V. Gabbi, W. G. Binney. Pl. 29, figs. 73, 74.

Imperforate, globose, very thin, pellucid, polished, olivaceous brown; whorls 3; aperture rounded, slightly oblique; peristome simple, flexuose above. Diam. 6, alt. 4 mill.

Animal greenish, with a black band above the margin of the foot and a second broader band a little higher up, broken by oblique light lines, median line of back nearly white.

It has the peculiarity when distressed, as with the warmth of the hand, of throwing itself like a worm, with vigorous blows of its tail.

*Flanks of Pico Blanco, 3000 ft., Costa Rica.*

## Genus HELICARION, Fér., 1821.

### I. *Australian and Polynesian Species.*

This group is composed of the typical Helicariæ, according to Godwin-Austen, as well as a few Australian species described as Vitrinæ. The latter I have placed at the end of my list, but included them here because Dr. J. C. Cox, in his Monograph of Australian Land Shells, states that all the Australian Vitrinæ have a caudal mucous pore.

H. Freycineti, Fér. Pl. 38, figs. 32–35.

Thin, smooth, faintly plicately striated, shining, opaque, orange-brown, suture linear; whorls 3¼, the last narrow at the base; lip narrowly membraneous-margined.

Diam. 19, alt. 8 mill.

*Australia.*

H. Cuvieri, Fér. Pl. 38, figs. 36–38.

Subglobosely depressed, lightly striate, greenish brown; whorls 3, the last large, rounded. Diam. 11, alt. 6·5 mill.

*Australia.*

This species, founded on figures in Férussac, has not been certainly identified by modern collectors.

H. leucospirus, Pfr. Pl. 38, fig. 39.

Depressed subglobose, very thin, striulate, pellucid, shining, yellowish white, the apex whitish; whorls 4, the last slightly

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pellucid-rayed, somewhat obliquely depressed above; margin subinflected. Diam. 13·5, alt. 8·5 mill.

*Australia.*

H. VERREAUXII, Pfr. Pl. 38, fig. 40.

Depressed, striulate, thin, diaphanous, hardly shining, greenish yellow; spire subplanulate, suture margined; whorls 3½, rapidly enlarging, the last depressed, the base rather narrow and flattened. Diam. 13, alt. 6 mill.

*Australia, Tasmania.*

H. CASTANEUS, Pfr. Pl. 38, fig. 41.

Depressed, striulate, very shining, chestnut-olive; spire plane; whorls 3, the last large, the base widely membraneously margined, margin of aperture membranaceous.

Diam. 9, alt. 5 mill.

*Australia.*

H. ROBUSTUS, Gould. Pl. 38, figs. 42, 43.

Depressed globose, polished, pellucid, light greenish yellow, lightly striate with growth-lines; spire obtuse; whorls 3, the last large, rounded below; columellar margin reflected at its insertion forming a small slit. Diam. 12, alt. 6 mill.

*E. Australia.*

Dr. Cox thinks that the next species is a probable synonym.

H. STRANGEI, Pfr. Pl. 38, figs. 44, 45.

Depressed semiglobose, very thin, smooth, shining, light greenish yellow, or corneous orange, suture submargined; whorls 3, rapidly enlarging, the last depressed above, more convex below; columellar lip narrowly membraneously margined.

Diam. 10, alt. 5 mill.

*Australia.*

An extensively distributed Australian species, varying much in size, but very constant in its general characters.

H. NIGER, Quoy. Pl. 38, figs. 46, 47.

Oval, depressed-semiglobose; whorls four, yellowish brown, the last rather large. Diam. 12, alt. 5 mill.

*Port Western, Australia.*

The name is for the blackish animal. The species has not been identified by Australian collectors.

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H. Mastersi, Cox. Pl. 38, figs. 48, 49.

Depressed, very thin, smooth, transparent, polished, with fine arcuate striæ and a few faint spiral lines, bright golden yellow, sometimes greenish tinged, suture impressed, narrowly margined; whorls 3, the last rather depressed above, more convex below, where it is widely membraneous. Diam. 14, alt. 4·25 mill.

*Kiama, N. So. Wales.*

The animal is whitish, and not gray as in *V. Strangei*, and the shell is more depressed, with half the base membraneous.

H. Helenæ, Godwin-Austen. Pl. 38, figs. 50, 51.

Elongately oval, smooth, polished, pale greenish yellow, spire flat; whorls $2\frac{1}{2}$, rapidly increasing, the last much expanded and elongated in front; peristome thin, arcuate above.

Diam. 7·3 mill.

*Sydney, N. S. Wales.*

H. megastoma, Cox. Pl. 38, figs. 52, 53.

Depressed, elongate auriform, smooth, very thin, transparent, greenish yellow, shining, very faintly striated, spire not prominent; whorls 3, the last depressed above, rounded at the periphery and below, left margin of aperture and base of the shell flattened, membraneous. Diam. 11·25, alt. 2·5 mill.

*Clarence River, Australia.*

Placed by Pfeiffer in Helicarion, which, from its shape it can scarcely be. Appears to be a genuine Vitrina.

H. Keppelli, Pfr. Pl. 38, figs. 54–56.

Depressed, thin, very shining, pellucid, arcuately striated, especially at the suture; greenish yellow, suture submargined; whorls 3, rapidly enlarging, the last with a convex, narrow base; columellar lip membraneously submargined.

Diam. 14, alt. 6 mill.

*New Caledonia.*

H. Hilli, Cox. Pl. 38, figs. 57, 58.

Depressed, thin, shining, with incremental striæ, and slight irregular distant undulating spiral lines; yellowish brown, lighter on the base; whorls $4\frac{1}{2}$, rapidly increasing, the last largely expanded; lip submembraneous.

Diam. 8·5, alt. 3·5 mill.

Top of a high mountain, *Lord Howe's Island.*

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H. TENELLUS, Gould. Pl. 38, figs. 59, 60.

Subperforate, depressed semiglobose, with conspicuous growth-lines, yellowish white; whorls 3, the last rounded at the periphery, suture well-impressed; aperture subcircular.

Diam. 8, alt. 5·5 mill.

*Sandwich Islands.*

Said to resemble *Vitrina pellucida*, and probably a true Vitrina.

H. CAPERATUS, Gould. Pl. 38, figs. 61–63.

Helicoid, depressed, narrowly perforate, periphery obtusely angulated, thin, subtranslucent, closely striate, with slight spiral impressed lines, and obscure malleations; yellowish corneous; whorls 3½, convex, with well-impressed suture; aperture subcircular, lip everted at the umbilicus. Diam. 12, alt. 6 mill.

*Sandwich Islands.*

*Helix Newcombi*, Pfr., is a synonym.

H. PLANOSPIRUS, Pfr. Pl. 38, figs. 64–66.

Imperforate, oval, thin, striulate, pellucid, shining, greenish corneous, flattened above, convex below; whorls 3, very rapidly enlarging; base membraneous-submargined.

Diam. 13, alt. 7 mill.

*Solomon's Is.*

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H. ZEBRA, Le Guillou. (Unfigured.) *Ins. Aukland.*

H. BRAZIERI, Cox. (Unfigured.) *Fitzroy Island, Australia.*

*Species included by Pfeiffer in Vitrina.*

H. MACGILLIVRAYI, Cox. Pl. 39, figs. 67, 68.

Much depressed, ear-shaped, thin, translucent, polished, lightly striated, with a few very slight impressed spiral lines; whorls 3, the last large, flattened; columellar margin flattened.

Diam. 20, alt. 6·5 mill.

*New South Wales.*

The animal when disturbed exudes a purple secretion. First described under the name of *V. planilabris*, preoccupied.

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H. MILLIGANI, Pfeiffer. Pl. 26, figs. 11, 12.

Imperforate, thin, smooth, very shining, olivaceous brown; whorls 3, rapidly enlarging; lip subinflected.

Diam. 22·5, alt. 10·5 mill.

*Isl. in Macquarie Harbor, Tasmania.*

Pfeiffer includes this in Paryphanta, evidently erroneously.

H. VIRENS, Pfr. Pl. 39, figs. 69–71.

Depressed subglobose, very slightly striate, somewhat shining, greenish corneous; whorls 3, rapidly enlarging, the last slightly obliquely depressed, base narrowly membraneously margined; aperture oblique, lunately subcircular, lip thin, subinflected.

Diam. 16, alt. 8 mill.

*Moreton Bay, Australia.*

H. AQUILA, Cox. Pl. 39, figs. 72, 73.

Globosely depressed, but little shining, regularly and strongly striated with lines of growth which are decussated by very fine striæ, yellowish opalescent, more opaque below; spire raised papilliform; whorls 4, the last globose, suture broadly and distinctly margined. Diam. 20, alt. 11·25 mill.

*Queensland, Australia.*

H. HYALINUS, Pfr. Pl. 39, figs. 75, 76.

Depressed globose, very thin, smooth, pellucid, greenish hyaline; whorls nearly 4, the last smooth towards the margined suture, distantly radiately striated, rounded at the rather wide base. Diam. 7, alt. 3·5 mill.

*Moreton Bay, Australia;* on trees.

H. INFLATUS, Reeve. Pl. 39, fig. 74.

Ovately ear-shaped, yellowish horny, but little shining, spire small, scarcely emerged, whorls convex, inflated, thinly arcuately striated; aperture rather largely openly ovate.

*Sydney, New South Wales.*

The above is a copy of Reeve's description. No measurements are given.

H. SUPERBUS, Cox. (Unfigured). *Queensland, Australia.*

H. CUMINGII, Beck. Pl. 39, fig. 77.

Depressed globose, very thin, lightly striate, shining; yellowish white, with a chestnut line above the periphery, suture margined;

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whorls 4; columellar lip a little reflected above, forming a false rimation. Diam. 20, alt. 12 mill.

*Ins. Bohol, Philippines.*

H. GUIMARASENSIS, Pfr. Pl. 39, figs. 78–80.

Depressed semiglobose, thin, striulate, subdiaphanous, greenish yellow; suture margined; whorls not 4, rapidly enlarging, the last inflated, subdepressed. Diam. 15, alt. 8 mill.

*Ins. Guimaras, Philippines.*

H. BECKIANUS, Pfr. Pl. 39, figs. 81–83.

Depressed semiglobose, very thin, striulate, pellucid, shining, light greenish yellow; whorls almost 4, rapidly enlarging, the last subdepressed, base wide; columellar lip slightly reflected above. Diam. 16, alt. 8 mill.

*Philippines.*

H. POLITISSIMUS, Beck. Pl. 39, figs. 84–86.

Rather thin, smooth, highly polished, diaphanous, corneous with darker rays, suture submargined; whorls 4, rapidly enlarging, the last depressly-rounded, base wide.

Diam. 14, alt. 7·5 mill.

*Ins. Zebu, Philippines.*

H. LEYTENSIS, Beck. Pl. 39, figs. 87–89.

Rather depressed above, more convex below, very thin, smooth, highly polished, greenish yellow; whorls 3, rapidly enlarging, the last subplanate above; columellar margin slightly reflected above. Diam. 13, alt. 7 mill.

*Philippines.*

Var. $\beta$. A little larger, subopaque, yellowish white.

H. MARGARITA, Beck. Pl. 39, figs. 90–92.

Very thin, striulate, shining, pellucid, greenish yellow; whorls $3\frac{1}{2}$, the last large, inflated; lip very thin. Diam. 14, alt. 8 mill.

*Philippines.*

H. TIGRINUS, Semper. Pl. 39, figs. 93–95.

Very thin, striulate, shining, yellowish white, suture smooth, margined; whorls $4\frac{1}{2}$, rapidly enlarging, the last inflated; columellar lip a little reflected above. Diam. 15·5, alt. 9 mill.

*Jibon, Ins. Mindanao, Philippines.*

The animal is variegated with black and yellowish gray.

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H. GUTTA, Pfr. Pl. 39, figs. 96–98.

Subglobose, a little depressed above, very thin, smooth, hyaline, highly polished; suture narrowly margined; whorls 3½, rapidly enlarging, the last large, depressed-rounded; columellar margin entering and a little reflected above. Diam. 11, alt. 6 mill.

*Sorsogon, Isl. of Luzon, Philippines.*

H. BICARINATUS, Semper. Pl. 39, fig. 99.

Shell like *H. gutta*, but somewhat larger. The unique specimen was broken in extracting the animal. The shell lobes of the animal, each traversed by a submedian carina.

*Ins. Luzon, Philippines.*

H. RUFESCENS, Pfr. Pl. 39, figs. 100, 1, 2.

Very thin, plicatulate, shining, pellucid, brownish horn-color, spire depressed conoidal; whorls scarcely 4, the last ventricose. Diam. 13, alt. 8 mill.

*Mindoro, Philippines.*

H. CRENULARIS, Beck. Pl. 39, figs. 3–5.

Very thin, glabrous, shining, pellucid, greenish orange; spire plane; whorls 3½, plicately crenulated towards the suture, rapidly enlarging, the last depressed, base wide. Diam. 13, alt. 7 mill.

*Philippines.*

Var. *β*. Slightly larger, the crenulations less distinct.

H. INCERTUS, Semper. Pl. 39, fig. 6.

Imperforate, depressed, semiglobose, very thin, shining, girdled with obtuse distant striæ, greenish corneous; spire rather flat, suture crenulated; whorls 3½, very rapidly increasing, the last rounded; aperture oblique, rounded oval, wider than high; lip very thin, membranaceous, outer margin a little dilated, columellar margin slightly reflected. Diam. 10·5, alt. 5·5 mill.

*Alpaco, near Zebu, Philippines.*

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*Unfigured Philippine Island Species.*

H. LUZONICUS, Pfr.; H. SMARAGDULUS, Beck; H. HELICOIDES, Semper; H. RESILIENS, Beck; H. BICOLOR, Beck.

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II. *Species of Asia and the East Indies.*

H. AUSTENIANUS, Nevill. Pl. 40, figs. 7, 8, 9.

Semiglobose, heliciform, thin, glossy, brownish yellow; whorls 5, with deep suture, last whorl a little slopingly depressed above; aperture rounded-lunate, a little oblique, columellar lip slightly reflected above over the umbilical region.

Diam. 15·5, alt. 7·5 mill.

*Sonamarg, Kashmir.*

H. STOLICZKANUS, Nevill. Pl. 40, figs. 10–12.

Depressed, thin, translucent, yellowish horn-color; whorls 5, rather narrow, convex, striated, with deep suture.

Diam. 21, alt. 10 mill.

*Kashmir.*

Confounded by Reeve, Hanley, etc., with *H. monticola*, Benson. Is possibly a small variety of *H. cassida*, with less exserted whorls and rather differently colored.

H. SOGDIANUS, Martens. Pl. 40, figs. 13–15.

Very narrowly perforate, depressed, lightly plicatulate, with obscure impressed spiral lines, shining, amber-colored, suture margined; whorls $4\frac{1}{2}$ to 5; columellar margin a little reflexed above. Diam. 22, alt. 11 mill.

*Samarkand.*

H. FLEMINGI, Pfr. Pl. 40, figs. 16–18.

Globosely depressed, thin, above plicately striate, with obscure spiral impressed lines, rather dull, olivaceous-fulvous, suture narrowly white-margined; whorls $4\frac{1}{2}$, the last large, very slightly compressed around the periphery, base smoother and more shining; aperture pearly, the columellar lip a little reflected above. Diam. 33, alt. 18 mill.

*India.*

H. CASSIDA, Hutton. Pl. 40, figs. 19, 20.

Depressed, thin, striulate, barely shining, subdiaphanous, light greenish yellow, spire very depressed conoidal, suture submarginate; whorls scarcely 5, rapidly enlarging, the last widely rounded, base wide, impressed in the middle; aperture pearly, columellar lip subcallous above. Diam. 26, alt. 12 mill.

*Simla, Western Himalayas.*

See remarks under *H. Stoliczkanus*, above.

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H. MONTICOLA, Benson. Pl. 40, figs. 21–23.

Depressed, thin, striulate, shining, pellucid, yellowish, corneous; spire plane, suture lightly impressed; whorls 4, rapidly increasing, flattened, the last not descending.

Diam. 18, alt. 7·5 mill.

*Western Himalayas.*

H. SCUTELLA, Benson. Pl. 40, figs. 24, 25.

Depressed, oblong-ovate, arcuately striulate, shining, translucent, light greenish yellow, spire nearly planate, suture marginate; whorls 3½, rapidly enlarging. Diam. 16–18, alt. 5–6 mill.

*Khasi Mts.; Kashmir.*

A little more depressed, more oblong, with fewer whorls than *H. monticola.*

H. HETEROCONCHA, Blanford. Pl. 40, figs. 26–28.

Depressed, thin, diaphanous, polished, obsoletely arcuately striate, irregularly subcostulate towards the aperture, yellowish corneous, more greenish near the aperture, spire planate, suture white-margined; whorls three, rapidly increasing; basal margin of aperture flattened, rather widely membraneous.

Diam. 17, alt. 5 mill.

*Darjiling, India.*

H. OVATUS, Blanford. Pl. 40, figs. 29, 30.

Depressed, rather thin, diaphanous, polished, obsoletely arcuately striate, yellowish brown; whorls 3½, the last descending near the aperture, suture margined. Diam. 11·5, alt. 5 mill.

*Darjiling, India.*

H. CHRISTIANÆ, Theobald. Pl. 40, figs. 31, 32.

Subglobose, thin, polished, diaphanous, shining, costulately striate above, amber-brown, the apex lighter; whorls 3½, slowly increasing. Diam. 13, alt. 8 mill.

*Andaman Isles.*

H. IRRADIANS, Pfr. Pl. 40, fig. 33.

Depressed above, more convex below, thin, impressly arcuately striate and obsoletely spirally lineate, diaphanous, scarcely shining, cinnamon-corneous above, smoother, more shining and lighter colored, yellowish green, below, suture margined; whorls scarcely 4, rapidly enlarging, the last flattened above.

Diam. 18·5, alt. 8·5 mill. *Ceylon.*

Var. β. Larger. Diam. 25, alt. 11 mill.

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H. MEMBRANACEUS, Benson. Pl. 40, figs. 34, 35.

Depressed, submembranaceous, obsoletely obliquely striulate, the striæ closer towards the apex, pellucid, greenish corneous, spire subplanate, suture not margined; whorls 3½, rapidly enlarging. Diam. 11, alt. 4 mill.

*Ceylon.*

H. CEYLANICUS, Beck. Pl. 41, figs. 39–41.

An undescribed species, figured and named in Beck's Index; it has not been identified.

*Ceylon.*

H. BIRMANICUS, Phil. Pl. 41, fig. 42.

Semiglobose, very thin and smooth, shining, yellowish green; whorls 4, rapidly enlarging, the last subplanulate at base. Diam. 9·3, alt. 4·6 mill.

*Mergui, Burmah.*

H. RHAPHIELLUS, Martens. Pl. 40, figs. 36–38.

Heliciform, rimate, thin, shining, yellowish, with white-bordered suture; whorls 3, darker colored near the aperture; columellar lip reflected above, the extremities of the lip joined by a callus. Diam. 7·5, alt. 5 mill.

*Siam.*

H. COCHINCHINENSIS, Morelet. Pl. 41, figs. 43–45.

Depressed globose, very thin, and lightly striate, with obsolete spiral lines, pellucid, greenish corneous, suture narrowly margined; whorls 3½, rapidly enlarging, base subrugulose. Diam. 23, alt. 12 mill.

*Dien-ba, Cochin China.*

H. RUSSEOLA, Morelet. Pl. 41, figs. 46–48.

Subperforate, globosely depressed, very thin, pellucid, shining, radiately striulate below the suture, orange-brown, suture submargined; whorls 3, rapidly increasing. Diam. 7, alt. 4·5 mill.

*Cochin China.*

H. NUCLEATUS, Stoliczka. Pl. 41, figs. 49–51.

Thin, translucent, light corneous, shining, very minutely striate; whorls 3¾; lip very thin, Diam. 9, alt. 5·3 mill.

*Penang.*

H. PERMOLLIS, Stoliczka. Pl. 41, figs. 52–54.

Conoidally helicoid, imperforate, very thin, almost membranaceous, translucent, light yellowish; whorls 4½, lightly striate, the last with obsolete spiral lines on the base; columellar lip slightly reflected above. Diam. 8·4, alt. 6·3 mill.

*Penang.*



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H. LINEOLATUS, Martens. Pl. 41, figs. 55–57.

Perforate, distinctly striulate, and with light spiral lines, shining, light orange, lighter below, a narrow opaque orange zone at the suture, suture radiately plicatulate; whorls scarcely 4; columellar lip a little reflected above. Diam. 19, alt. 12 mill.

*Java, Sumatra.*

A smaller variety, diam. 12, alt. 8 mill., is found in Sumatra, the type being Javanese.

H. SUMATRENSIS, Schepman. Pl. 41, figs. 58–60.

Perforate (?), shining, pellucid, yellowish brown, striulate, with spiral lines; suture margined; whorls 4.

Diam. 7·5, alt. 5·75 mill.

*Sumatra.*

H. BORNEENSIS, Pfr. Pl. 41, figs. 61–63.

Very thin, striulate, and with obscure lightly impressed spiral lines, pellucid, light corneous, suture submargined; whorls 4, rapidly increasing, base obliquely rugulose. Diam. 15, alt. 9 mill.

*Borneo.*

H. SERICEUS, Martens. Pl. 41, figs. 64–66.

Perforate, striate, shining, light orange-brown, with a chestnut line at the suture; whorls $4\frac{1}{2}$; columellar margin very slightly reflected. Diam. 14, alt. 9 mill.

*Timor.*

H. IDÆ, Pfr. Pl 41, figs. 67–69.

Thin, arcuately striulate, shining, pellucid, yellowish corneous; whorls 4. Diam. 14, alt. 7·6 mill.

*Celebes.*

One of Pfeiffer's figures shows a narrow orange-brown band—which is not mentioned in the description.

H. CELEBENSIS, Pfr. Pl. 41, figs. 70–72.

Helicoid, a little solid, striulate, shining, coffee-colored, with a lighter margin around the suture; whorls 4; columellar margin subcallous. Diam. 11·5, alt. 7 mill.

*Celebes.*

H. SUTURALIS, Martens. Pl. 41, figs. 73–75.

Shell striulate, very shining, greenish yellow, more distinctly striate and with an opaque white zone at the suture, suture margined; whorls 4. Diam. 15, alt. 10; var. diam. 20, alt. 12 mill.

*Isl. Buru, Moluccas.*

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H. IMPERATOR, Gould. Pl. 41, figs. 76–78.

Fragile, ventricose, striulate, with impressed spiral lines, greenish corneous; whorls more than 3; columellar margin not thickened. Diam. 1·5, alt. ·75 in.

*Hong Kong, China.*

The largest species of the genus; perhaps belongs to same group as *H. præstans*, Gould. Westerlund has described (but not figured) a var. *imperatrix*.

H. PRÆCELLENS, Martens. Pl. 42, figs. 1, 2, 3.

Thin, diaphanous, regularly striulate and with light impressed lines on the upper part, shining, yellowish green, with a narrow brown sutural line; whorls less than 3. Diam. 28, alt. 19 mill.

*Isl. of Salanga, West Coast of Malacca.*

*Unfigured Species.*

H. BACCATA, Hutton. *Afghanistan.*
H. EDGARIANUS, Benson. *Ceylon.*
H. ATARANENSIS, Theobald. *Martaban, Burmah.*
H. SIAMENSIS, Haines (Diam. 30, alt. 15 mill.). *Siam.*
H. ALBELLA, Martens. *Java.*
H. SINICUS, Martens. *China.*

Section CRYPTOSOMA, Theobald, 1857.

Shell more solid; animal completely retractile within it, and closing the mouth with an epiphragm in æstivation.

Perhaps other Asiatic species may enter this section.

H. PRÆSTANS, Gould. Pl. 42, figs. 4, 5.

Rather solid, smooth, very lightly striulate with obsolete impressed spiral lines, slightly shining, light corneous; whorls 3, rapidly enlarging. Diam. 25, alt. 12 mill.

*Burmah.*

Section AUSTENIA, Nevill, 1878.

* *Typical.*

H. GIGAS, Benson. Pl. 42, figs. 6, 7.

Arcuately striate, with obsolete irregular impressed spiral lines; whorls 2½, very rapidly increasing, the last subdepressed above, base very narrow; aperture very large, subcallous within. Diam. 30, alt. 13 mill.

*Bengal.*

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H. MAGNIFICUS, Austen and Nevill. Pl. 42, figs. 12, 13.

Closely allied to *H. gigas*, but larger, brownish, body-whorl much more flatly expanded, spire less convoluted, more depressed. Diam. 46, alt. 29·5 mill.

*Momein in Yunnan*, at 5500 feet.

H. HYALEA, Bock. Pl. 42, figs. 8, 9.

Thin, glossy, sculptured with very fine growth-lines and microscopic impressed spiral striæ; whorls 2–3, margined at the suture, last whorl very large, as is also the aperture; glossy olive-brown.

Diam. 20 mill. *Sumatra.*

H. RESPLENDENS, Nevill. Pl. 42, figs. 10, 11.

Resembling *H. gigas*, Bens., in texture and color, but a little thinner and more membranaceous; it is at once distinguished from it by its flattened, more ear-like form.

Diam. 22, alt. 8 mill. *Sawady and Rhamo, Upper Burmah.*

Animal light pink, thickly dotted with black on the mantle-lobes and caudal extremity, sparsely dotted elsewhere.

H. VENUSTUS, Theobald. Pl. 42, fig. 14.

Yellowish, oval, depressed, whorls about 2, the last rapidly changing, aperture very oblique, almost horizontal.

Diam. 7·5 mill. *Mts. Arakan.*

***Approaching Parmarion.*

H. SOLIDUS, Godwin-Austen. Pl. 42, fig. 15.

Shell flat, periphery oval, solid, epidermis reddish brown; spire short, apex very flat; one single body-whorl, peristome simple, thin. Diam. 15 mill.

*Hengdan Peak, North Cachar Hills, Bengal.*

Approaches Parmarion, Fischer, and was described as a doubtful species of Hoplites, which is synonymous with Parmarion. Neville supposes it to = the preceding species.

H. PEGUENSIS, Theobald. Pl. 42, figs. 16, 17.

Auriform, very thin, striate, polished, epidermis membranaceous, greenish yellow or yellowish brown, nucleus lighter, spire planulate; whorls 1½; aperture transverse, horizontal, showing the spire, peristome membranaceous. Diam. 13, alt. 2·5 mill.

Near *Pegu; Nilgiri Mts., India.*

The latter locality is for *H. auriformis*, Blanford, an unfigured

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species which, according to Hanley and Theobald, is synonymous. Approaches Parmarion very closely.

H. UNGUICULUS, Morelet. Pl. 42, figs. 18–20.

Depressed, convex above, open below, thin, shining, light corneous, lightly striulate, crossed by distant lines, suture margined; whorls 2, convex, very narrow and membraneous below, showing the spire. Diam. 9, alt. 3 mill. *Cochin China.*

H. APERTUS, Beck. Pl. 42, fig. 21.

Much depressed, base open, showing the spire, smooth, subopaque, greenish white, spire minute, lateral; whorls 2½, base very narrow. Diam. 11, alt. 3 mill. *Ins. Luzon, Philippines.*

H. DIMIDIATUS, Pfr. Pl. 42, fig. 22.

Very depressly ovate, open at the base, yellowish horny, spire small, rather flat, lateral, whorls slightly convex, smooth, membranaceous at margin. Diam. 5·5, alt. 1·3 mill. *New Zealand.*

H. AUSTRALIS, Reeve. Pl. 42, fig. 23.

Very depressly ear-shaped, open at the base, yellowish horny, spire small, rather immersed, whorls impressed at the sutures, faintly arcuately plicately striated, membraneous at the edge. *Eastern Australia.*

"This, and six other species of the plate, belong to the genus Peltella of Webb and Van Beneden, in which only a section of the whorls is formed; the base of the shell next the animal is open, or too membranaceous to be preserved"—(Reeve). No dimensions are given. The resemblance to Peltella is apparent, but until it is ascertained whether the shell possesses a membranous base, absent in the figure, its generic position cannot be determined with certainty.

*** *Species referred to Austenia by Godwin-Austen, but which have the form of true Helicarion.*

H. SALIUS, Benson. Pl. 42, figs. 24–26.

Subglobosely depressed, ovate, very thin, fragile, very shining, pellucid, brownish corneous or light corneous, obsoletely arcuately striulate, suture lightly impressed, margined; whorls 3½. Diam. 8, alt. 4 mill. *Darjiling*, and *Teria Ghát, India.*

Godwin-Austen includes this in Austenia, but I see no good

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reason why it should not be considered a true Helicarion. This author describes a var. *ovata* (fig. 26).

H. PAPILLASPIRA, Godwin-Austen. Pl. 42, figs. 27, 28.

Imperforate, membranaceous, shining, sculpture of growth-undulations, otherwise quite smooth, pale ochraceous green; whorls 4, irregularly wound; peristome sinuate above, slightly reflected at the umbilical region. Diam. 11, alt. 4·5 mill.

*North Khasi Hills, India.*

Differs from *H. Salius* in the greater number of whorls, and peculiar smaller, closer-wound, nipple-like apex.

H. MINUTUS, Godwin-Austen. Pl. 42, fig. 29.

Shell ovate, depressed, rather solid, brown with an olive tinge, and with a glazed polished surface; whorls 3, very rapidly enlarging; aperture oblique, elongately lunular.

Diam. 5·5 mill. *Assam.*

It may be known from *H. Salius* by its much flatter form.

H. GLOBOSUS, Godwin-Austen. Pl. 42, figs. 30, 31.

Tumidly globose, quite smooth, pale ochraceous; whorls 3; columellar lip weak, not thickened. Diam. 9·4, alt. 3·4 mill.

*Toruputu Peak, Dafla Hills.*

H. PANCHETENSIS, Godwin-Austen. Pl. 43, figs. 32, 33.

Imperforate, depressed globose, rather thickened, covered with a strong epidermis, dull ochraceous brown, suture shallow; whorls 3, flat above, rapidly increasing, the last descending; peristome rather thickened, columellar margin perpendicular.

Diam. 10·7, alt. 4·5 mill.

*Panchet Hill, L. Bengal.*

Distinct from the next species in the last whorl descending near the aperture, in its more shelly structure and globose form.

H. BENSONI, Pfr. Pl. 43, figs. 34–37.

Thin, striulate, shining, pellucid, light corneous, suture submargined; whorls $3\frac{1}{2}$, base wide; peristome subinflected.

Diam. 12, alt. 6 mill.

*Jessore; Botanical Garden, Calcutta.*

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Var. SYLHETENSIS, Godwin-Austen. Fig. 37.

Last whorl more expanded in front, texture thinner, color more greenish.

*Sylhet District.*

H. SUCCINEUS, Reeve. Pl. 43, figs. 38–41.

Thin, smooth, obsoletely arcuately striulâte, translucent, polished, corneous, flattened above, suture canaliculately margined; whorls 3, rapidly enlarging, the last slightly descending, compressed-rounded at the periphery. Diam. 14, alt. 5 mill.

*Pankabari, Vallis Rungun, India.*

Described by Benson under the name of *H. planospira*, preoccupied by Pfeiffer.

H. VERRUCOSUS, Godwin-Austen. Pl. 43, fig. 55.

"The shell with animal was placed in spirit, but has been unfortunately lost; it was thin and glassy, with about 4 whorls. I however made a careful drawing of the animal at the time it was taken." Animal dull purplish gray; mantle-lobes, which can cover the entire shell, are very minutely mottled, finely papillate; posterior margin with three wart-like processes on each side; posterior part of foot with diagonal parallel ribs; edge of foot with a distinct marginal line. The mantle is divided into three lobes, one of rectangular outline is on the anterior left margin. The shell when the animal is in motion is very slightly exposed.

*Under Torúpútú Peak, at 4600 feet, Assam.*

Section AFRICARION, Godwin-Austen.

H. LYMPHASEUS, Morelet. Pl. 43, figs. 42–44.

Very thin, shining hyaline, light yellowish brown, unequally arcuately striate, suture very narrowly margined; whorls 3, flattened above, rounded below, the last enlarging rapidly, transverse. Diam. 13, alt. 6 mill.

*Bogos, Abyssinia.*

H. PALLENS, Morelet. Pl. 43, figs. 45–47, 48.

Depressed above, somewhat turgid below, thin, striulate, pellucid, light yellowish; whorls 3, the last large, and obsoletely radiately plicate at the suture. Diam. 12–13, alt. 5 mill.

*Bogos, Abyssinia.*

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*** *Species included by Pfeiffer and Semper in Mariaella.*

H. RAFFRAYI, Bourg. Pl. 43, figs. 56–58.

Imperforate, semiglobose, more convex below, hyaline, rather thin, shining, light yellowish corneous, smooth, last whorl slightly striulate; whorls 3, suture margined; columellar lip a little reflected above. Diam. 9, alt. 7 mill.

*Abyssinia.*

H. ARAYATENSIS, Semper. Pl. 43, figs. 59–61.

Depressed, thin, rather smooth, shining pellucid, suture margined; whorls 3½, rapidly increasing, the last depressed, with obsolete spiral lines, aperture transverse.

Diam. 13–14, alt. 5 mill.

*Ins. Luzon, Philippines.*

Perhaps a major var. of *H. planulatus*, Pfr.

H. PLANULATUS, Pfr. Pl. 43, fig. 62.

Very depressed, car-shaped, transparent horny, spire flattened, whorls 3, plicately striated; aperture very large, oblique.

Diam. 11, alt. 4–5 mill.

*Ins. Luzon, Philippines.*

H. PAPILLATUS, Pfr. Pl. 43, fig. 63.

Depressed, nearly orbicular, pale horny, shining, pellucid, light corneous, apex papillary, suture margined, last whorl with obsolete spiral lines; whorls 3½. Diam. 10, alt. 5 mill.

*Ins. Luzon, Philippines.*

***

? H. PLICATULUS, Martens. Pl. 43, figs. 49–51.

Rimate, thin, rather regularly plicatulate, shining, light greenish gray; whorls 3¼, margin somewhat membranaceous, shortly reflected at the umbilicus. Diam. 17, alt. 9 mill.

*Aburi, Gold Coast, W. Africa.*

? H. SEMIMEMBRANACEUS, Martens. Pl. 43, figs. 52–54.

Depressed, auriform, very thin, lightly radiately striulate, shining, light amber-colored, membranaceous below, spire plane; whorls less than 2½, rapidly enlarging, periphery angulate; aperture subhorizontal, showing the spire, lip membraneously bordered. Diam. 19, alt. 6 mill.

*Victoria, and Delta of Cameroons River, W. Africa.*

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## Family *LIMACIDÆ*.

Shell rudimentary, a calcareous plate, not spiral, concealed under the mantle, and covering the respiratory cavity. Foot without mucous pore. Jaw oxygnathous, arcuated, without ribs, with a rostriform projection on the inferior margin. Central tooth of the lingual series tricuspidate, the middle cusp long and narrow, laterals bi- or tricuspidate, marginals narrow, sharply uni- or bicuspidate.

*Synopsis of Genera.*

### Genus LIMAX, Linn., 1758.

Animal attached its whole length to the foot, subcylindrical, somewhat truncate anteriorly, tapering behind and carinate towards the tail, without mucous pore; mantle small, anterior, forming a shield and enclosing a nonspiral calcareous plate, locomotive disk distinct, trizonate, respiratory orifice posterior on the right margin of the mantle. Jaw smooth, with median projection (Pl. 44, fig. 2); lingual membrane long and narrow; central teeth tricuspid, laterals bicuspid, marginals aculeate, often bifid (Pl. 44, fig. 1). Shell-plate with lateral nucleus. Animal lively.

Here may be referred *Lallemantia*, Mabille, in which the portion of the shield over the shell-plate is raised, simulating a second, smaller shield: a character of certainly no more than specific importance.

*Limacus*, Lehmann, may also be referred here.

#### Section Limax (*sensu stricto*).

= *Heynemannia*, Malm, = *Eulimax*, Moquin-Tandon; *Stabilia*, *Chromolimax*, *Opilolimax*, *Gestroa*, Pini; *Limacus*, Lehmann; *Frauenfeldia*, Hazay. Animal having a concentrically striated shield; lively in habit. Central tooth of the lingual series sharply one-pointed, obsoletely tricuspidate, marginal teeth bifid. Eggs ellipitical. Shell-plate with terminal lateral nucleus.

#### Section Lehmannia, Heynemann, 1863.

Median teeth of the radula, with a rounded point; eggs oval. Animal of softer texture than Limax. Shell-plate with lateral nucleus.

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Section IBYCUS, Heynemann, 1862.

Median tooth of the radula with a rounded point (Pl. 44, fig. 4). Shell swollen, convex, of horny leathery texture, shining, transparent.

Section AGRIOLIMAX, Malm, 1870.

Animal shortly carinate behind. Central tooth of radula three-pointed, laterals two-pointed. Eggs orbicular.

The progressive school of malacologists regards *Agriolimax* as a genus, distinguishing *Malacolimax*, Malm, as a subgenus, with utterly unimportant characters. I do not think that this section is well-founded, but retain it as convenient for grouping the species.

Section PARALIMAX, Böttger, 1883.

Differs from *Limax* in the respiratory orifice, being on the *anterior* right margin of the shield.

Section CLYTROPELTA, Heynemann, 1867.

Shell plate mytiliform.

Section KRYNICKIA, Kal., 1839 (*Hydrolimax*, Malm).

Shield very large, only adhering posteriorly, body slender, respiratory orifice at the posterior right margin of the mantle. *Limax brunneus*, Drap.

As originally described, species of other groups were included; subsequently the name was changed by the author to *Krynickillus*, which being objectionable, was restored to *Krynickia*. Mabille has divided the section into two groups, *Malino*, Gray, and *Malinastrum*, characterized by mantle shagreened, and striate respectively.

*Malino*, Gray, was founded upon a description and figure given in Morelet's work on the "Mollusks of Portugal;" it may probably be included here. The diagnosis is: "Body slender, obtusely keeled, ending in an acute prism; head produced; shield large, anterior, oblique, longitudinally grooved; front part much produced, concentrically grooved, very contractile, very mobile, and moves rapidly from left to right and *vice versa*, as the animal walks; orifice of respiration large, behind the middle of the shield. Shell (quite hidden) not described. Very vivacious; singularly elongates the head when walking."

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Section MEGAPELTA, Mörch, 1857.

Mantle covering more than half the body.—(H. and A. Adams' "Genera.")

The above is the only diagnosis given. Mörch himself subsequently referred the animal with doubt to *Ariolimax*. Dr. Fischer remarks that it approaches *Krynickia* closely. As the genus is founded on a drawing only, its characters are scarcely capable of description.

Genus AMALIA, Moquin-Tandon, 1855.

Strongly carinated from shield to tail; shield granular, truncate or emarginate behind, with a median subcircular sulcus; shell-plate with median (instead of lateral) nucleus. Animal sluggish (whilst *Limax* is lively). Central tooth of the radula three-pointed; laterals also three-pointed (Pl. 44, fig. 3). *Milax*, Gray, is a synonym.

The length of the carina, form and sulcus of the shield, position of the shell-apex, dentition, and sluggish habit distinguish *Amalia* from *Limax*. The subgenera *Tandonia* and *Pirainea*, Lessona and Pollonera, founded on very slight anatomical differences, may be considered synonyms.

*Aspidiporus*, Fitzinger (1883), a *Limax* having a perforated mantle is a malformed *Amalia*, according to Heynemann, who has recently (1884), examined the original type.

Section SANSANIA, Bourguignat, 1877.

Is characterized by its shell plate with a triangular emargination; nucleus on the median line. *Limax Larteti*, Dupuy, fossil (Pl. 45, fig. 25), *Sansan*, *France*.

A character of so variable a nature as the interior shell-plate of a snail, can scarcely be maintained as having any value. The plate in the recent *Amalia sicula* partakes of this character. *Palizzolia*, Bourg., 1877, differs scarcely at all from *Sansania*.

Section GIGANTOMILAX, Böttger, 1883.

Shield not sulcate, smooth, not emarginate behind.

Section EUMILAX, Böttger, 1881.

Respiratory orifice anterior to the middle of the right margin of the shield.

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### Genus PARMACELLA, Cuvier, 1805.

Animal limaciform, cylindrical, swollen behind, gradually attenuated in front, with a very long neck; without mucous pore; shield central, large, a large portion of the margin free, finely granular, concealing the shell-plate; pulmonary orifice on the posterior right margin of the shield; genital orifice behind and below the right eye-peduncle. Jaw smooth, arcuated, slightly rostriform in the middle. Lingual membrane with tricuspid central and first lateral teeth, the marginals narrow, bicuspid, but the exterior cusp short.

Shell small, testaceous, internal, with subspiral nucleus, the aperture very large, dilated anteriorly.

*Mediterranean countries, Western Asia, Canary Islands.*

Fossil in the Miocene of the *Rhone Basin.*

#### Subgenus CRYPTELLA, Webb and Bertholet, 1833.

Shell less distinctly spiral. *Canary Islands.*

Scarcely distinguishable from the type.

### Genus PHOSPHORAX, Webb and Bertholet, 1833.

Animal limaciform, swollen in the middle; mantle large, anterior, with a small posterior phosphorescent disk upon it, concealing a shell-plate; no longitudinal furrows above the margin of the foot, and no caudal mucous pore (?); distinct locomotive disk (?); respiratory orifice on right anterior margin of mantle. Jaw and lingual membrane unknown. Internal shell-plate thick, oval, testaceous. The single species, only known from a figure published many years ago, is said to inhabit Teneriffe.

### Genus OOPELTA, Mörch, 1867.

Animal limaciform, attenuated behind, without mucous pore; shield small, oval, granulated; respiratory orifice a little anterior. Jaw smooth, with a slight projection of its median margin. Radula like *Helix*, the marginal teeth obtuse (Pl. 44, fig. 5).

No internal shell. A single species inhabits *Guinea.*

This remarkable mollusk unites the external appearance and jaw of *Limax* with the dentition of *Helix*, and has no shell-plate.

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## Genus LIMAX, Linn., 1740.

### Section LIMAX (*sensu stricto*).

L. MAXIMUS, Linn. Pl. 46, figs. 31–35, 39; Pl. 49, fig. 76.

Animal ash-colored or yellowish white, longitudinally streaked or spotted with black, shield always black-spotted, sole ash or yellowish ash, always unicolored. Length, 6 inches.

*Europe.* Introduced into the *Eastern United States*, *Madeira.*

The species described by Linnæus has been referred by some authors to *L. cinereo-niger*, Wolf, distinguished by its parti-colored locomotive disk; they therefore have resuscitated other names for this species, such as *L. cinereus*, Lister, and *L. cellarius*, Argenville—both objectionable because given by polynomial authors. Whilst there may be some doubt as to Linnæus' species, there can be none as to the species which most conchologists have identified with it, and in that sense I preserve its name.

It is *Limacella parma*, Brard; *L. maculatus*, Nunneley; *L. antiquorum* (pars), Fér.

A large number of color varieties have been described, prominent among them being vars. *serpentinus* (fig. 32), *vulgaris* (fig. 34), *cellarius* (typical), *Johnstoni*, *maculatus*, *Ferrussaci* (fig. 35), *obscurus*, *fasciatus* and *rufescens*, of Moquin-Tandon, and *Cornaliæ*, of Pini (fig. 76).

Dr. J. Gwyn Jeffreys thus speaks of this species:

"This is the largest species of Limax, and sometimes exceeds six inches in length. It is inactive in its habits, not very prolific, and exudes a thick and glutinous slime which is iridescent when dried. Its eggs are deposited in a cluster and slightly attached to each other. When alarmed, or at rest, this slug merely draws its head within the shield, but does not otherwise contract its body. When irritated, it is said to expand its shield. It is liable to be infested, as well as some other slugs, by a white parasitic mite, which swarms about its body and, according to Mr. Jenyns, dwells in its respiratory cavity. Mr. Daniel informs me that these slugs suspend themselves in pairs during the breeding-season by threads of slime, and that they always feed by night. Like all other slugs and snails, it will soon eat its way out of a large pill-box, or even a stouter one

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made of cardboard, if confined in it. The shell or ossicle which is contained under the shield was known to Pliny; and it was used by the ancient physicians for the sake of its carbonate of lime."—(Brit. Conch., i, 137.)

Its introduction into the United States was first announced by the writer, in 1867, when it was discovered in cellars in Philadelphia. Within a few years its presence was signalized at Newport, R. I; Brooklyn, N. Y.; Pittsburgh, Pa., etc; and it has now become rather numerous in some localities. A shaded grassy bank in the yard of the Academy of Natural Sciences at Philadelphia affords numerous specimens to the students connected with that institution.

In deference to the opinion of the principal European malacologists I have treated as species a number of forms of Limax which I suspect should be preferably considered varieties only of the present species.

L. PUNCTULATUS, Sordelli. Pl. 46, fig. 36.

Yellowish ash, lighter on the middle of the back, rugose, regularly, somewhat distantly black-spotted; shield broadly rounded behind, with or without black spots; pulmonary aperture fuscous-margined; locomotive disk yellowish white, unicolored. Length, 4–5 inches.

*Lombardy.*

Said to be distinguished from *L. maximus* by its different pattern of maculations and the more rounded posterior margin of the shield. Vars. *parumpunctatus* and *Pradæ* of Pini, and *Pinianus* Lessona, have been described.

L. PSARUS, Bourg. Pl. 46, figs. 37, 42.

Elegantly cylindrically elongated, terminated by an acute, whitish carinated tail, elongately rugosely reticulated; bluish ash above, becoming yellowish ash on the flanks, with brilliant black spots on the large shield, and spots and stripes on the body; shield large, not adhering in front, anteriorly and posteriorly rounded, finely, irregularly (not concentrically) striated; respiratory orifice almost median; disk yellowish white, the marginal areas deeper colored. Length, 3 inches.

*Lombardy.*

A very doubtfully distinct form from *L. maximus.*

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L. GENEI, Lessona and Pollonera. Pl. 46, fig. 38.

Rugose, obtusely carinate behind, shield large, subgibbose, cuneate behind; pulmonary aperture post-median, light margined; light brownish, darker on the back, with three ochraceous longitudinal bands, with a few black spots on either side the posterior carina; shield sparsely black-spotted anteriorly, trizonate with ochre-yellow posteriorly; head and tentacles light brownish; sole unicolored? Length, 7 inches.

*Sardinia.*

L. UNICOLOR, Heynemann.

Large, moderately rugose; shortly obtusely carinate behind; shield large, not gibbose, acutely angulated behind, unicolored with white-margined pulmonary orifice; back cinereous or light brown or chestnut-color, sometimes obsoletely subfasciate, but not spotted; sole unicolored. Length, 3–4 inches.

*Middle Germany—Italy, Sicily.*

*L. concolor*, Pini, is a variety. Lessona and Pollonera have also described vars. *candidus*, *sordidus* and *Bivonæ*.

L. ABROSTOLUS, Bourguignat. Pl. 46, fig. 40.

Differs from *L. maximus* in its stronger, sharper, white terminal carina, the median black line of the neck, and its brilliant colors, fleshy on the back, becoming yellowish and then orange on the flanks, with large black spots. Length, 5 inches.

*Madeira.*

It is *L. antiquorum*, Lowe, not Férussac.

L. EUBALIUS, Bourguignat. Pl. 46, fig. 41.

Tail sharply carinate, carina whitish; color yellowish white, thickly spotted with black; dorsal rugosities delicate, low; foot pale yellowish; upper tentacles long and slim, inferior tentacles very short; shield anterior, rounded in front, rostrated behind; respiratory orifice small, post-median. Length, 60 mill.

*Grande Chartreuse, France.*

L. ATER, Razoumowsky. Pl. 46, fig. 43.

Coarsely rugose, tail-carina short, shield subgibbose, obtusely angulated behind; brownish or blackish, unicolored, pulmonary orifice and disk yellowish white. Length, 4 inches.

*Transylvania, Engadine, Northern Italy.*

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Var. MONTANUS, Leydig. Light grayish or grayish brown, with obsolete brown maculations.

Var. DUBIUS, Lessona and Pollonera. Light yellowish or brownish ash, shield confusedly zoned, back with four blackish zones.

Var. FASCIATUS, Razoum. Black, back with five continuous or interrupted whitish stripes, shield black, the free part white-margined.

L. CINEREO-NIGER, Wolf. Pl. 46, fig. 44; Pl. 47, figs. 45–47.

Large, coarsely rugose, the squamæ large and oblong, carina somewhat prominent, long; shield moderate, subgibbose, angulated behind, free part but little expanded, strongly concentrically rugose, unicolored or with obsolete marginal maculations; disk with brownish lateral zones. Length, 5–9 inches.

*Europe.*

In the opinion of some naturalists the *L. maximus*, of Linn., is this species, or includes it. The two are readily distinguished by the unicolored disk of *maximus*, particolored in *cinereo-niger*, and by the larger rugosities of the latter. *L. Decampi* has the shield more strongly acuminated posteriorly, more strongly developed anteriorly, more coarsely rugose, and its mucus is colored.

*L. Transylvanicus*, Kimak (not Heynemann), and perhaps vars. *Isseli* and *Strobeli* of Pini, are to be placed here; the two latter supposed by Lessona and Pollonera to be cases of albinism.

Numerous varieties have been described, including:—

Var. MAURUS, Held. Back black, lateral areas of the sole black, middle area yellowish white, pulmonary orifice black-margined.

Var. PAVESI, Pini (figs. 45, 46). Chestnut-brown, lateral areas of disk the same color, or bluish black, central area yellowish white.

Var. CAMERANI, Lessona and Pollonera. Smaller; chestnut-brown, with the carina and a narrow dorsal line of dirty white, pulmonary aperture white-margined.

Length, 3–4 inches.

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Var. LUCTUOSUS, Moquin-Tandon. Black, with the carina and dorsal zone of yellowish white.

Var. ORNATUS, Lessona. Black, with the carina and dorsal zone and two series of maculations, white.

Var. STROBELI, Lessona. Grayish, with the carina and a narrow dorsal zone of white, maculated with black and white on the back.

Var. STABILEI, Lessona (fig. 47). Blackish on the back, the sides lighter, zoned or maculated with black; shield black, lighter and maculated on the margins; lateral zones of the disk brownish.

Westerlund in his "Moll. Sveciæ" mentions vars. *leucogaster*, Mörch; *albus*, Paasch; *cinereo-nebulosus*, Malm; and *niger*, *fasciatus* and *flavescens*, Westerlund. Numerous other varieties have also been named by various authors; but they are all of too little importance to justify the expenditure of time necessary to arrange their synonymy.

L. DACAMPI, Menegazzi. Pl. 47, figs. 48–54; Pl. 48, figs. 55–58.

Large, rugosities thick, oblong, carina more or less developed, most frequently colored; shield large, gibbous, long-cuneate behind, concentrically rugose, unicolored, the free anterior margin extended; lateral zones of the disk dark; mucus orange-colored. Length, 6–10 inches.

*Northern Italy.*

Lessona and Pollonera, in their "Monografia dei Limacidi Italiani" (Mem. Accad. Torino, ser. ii, xxxv, 78), divide this species into three subspecies and numerous varieties, as follows:

Subspecies I. MENEGAZZII, Lessona and Pollonera.

Back unicolored or maculated, carina white.

Var. AMALIÆ, Bettoni (fig. 48). Bluish-black, with a white dorsal zone behind the shield; pulmonary orifice black-margined.

Var. PUNCTATUS, Lessona. Yellowish gray, becoming blackish blue posteriorly, with a few dorsal black spots, the carina whitish, shield brownish black, not maculated.

Subspecies II. RENIERI, Lessona and Pollonera.

Carina yellowish or orange-color.



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Var. ATRATUS, Bettoni (fig. 49). Grayish brown, the rugosities blackish, carina and dorsal zone sulphur-color, shield blackish, pulmonary orifice black-margined.

Var. ELEGANS, Bettoni (fig. 50). The sulphur-colored zone maculated and spotted with black and white, rest of the back greenish yellow, shield grayish, pulmonary orifice whitish-margined.

Var. SORDELLII, Bettoni (fig. 51). Brown, obscurely zonate on the back and irregularly maculated with white, zone sulphur-color, shield ash-yellow, pulmonary orifice brown-margined.

Var. NIGRICANS, Lessona. Black, with series of yellowish maculations, and an interrupted yellow dorsal zone.

Var. SULPHUREUS, Lessona. Brown, with series of blackish dots, carina sulphur-colored, shield brownish with a few black dots near the anterior margin.

Var. CALDERINII, Lessona. Reddish brown, the rugosities and shield paler, with round black maculations, in series as far as the shield, carina orange-colored, the coloring becoming evanescent beyond it.

Subspecies III. DACAMPI, Menegazzi (*stricto sensu*).

Carina reddish or scarlet color.

Var. TYPUS, Bettoni. Dirty whitish, the rugosities reddish, laterally reddish-brown; dorsally blood-red with two black zones; shield coppery red; pulmonary orifice black-margined; lateral areas of sole grayish black.

Var. TRILINEOLATUS, Bettoni (fig. 52). Reddish brown, carinal and dorsal red stripe extending to the shield, with a posterior red stripe on either flank, becoming evanescent on the back; pulmonary orifice brown-margined; sole yellowish, bordered with olive.

Var. MONOLINEATUS, Bettoni (fig. 53). Reddish white or light brown, with a single red dorsal stripe, bordered by maculations of black forming an interrupted stripe on either side; shield, orifice and sole as in preceding variety.

Var. PINII, Lessona and Pollonera (*L. cinereo-niger*, var. *Doriæ*, Pini). Blackish, red-striped on the carina, sole black-margined.

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Var. FUSCUS, Bettoni (fig. 55). Brownish red, with red carina and an interrupted red zone on either side; shield brownish; pulmonary orifice brown-margined; sole obscurely margined.

Var. TACCANII, Pini (fig. 56). Brown, the shield darker, carina and dorsal line blood-red; pulmonary orifice dark-margined; sole with central zone pinkish, laterals dusky.

Var. GUALTERII, Pini (fig. 54). Differs from var. *Taccanii* in having a red zone additional on either flank.

Var. MACULATUS, Lessona. Reddish brown, lighter on the back, irregularly quadrifasciate with black maculations, carina shortly red-striped.

Var. PALLESCENS, Lessona. Light reddish brown, with six zones of black maculations, carina light reddish; shield brownish, with darker brown nebulous maculations, and two or three black spots at the posterior margin.

Var. RUFESCENS, Lessona. Reddish brown, lighter on the sides, carinal stripe red, large; with biseriate black spots.

Var. MONOCROMUS, Lessona and Pollonera (var. *erytrus*, Pini, non *L. erytrus*, Bourg.). Red, unicolored; disk brown-zoned.

Var. VILLÆ, Pini (fig. 57). Reddish, the carina and rugosities blood-red, irregularly quadrizonate with black spots; shield reddish brown, unspotted; pulmonary orifice red-margined; sole with pink central and dusky lateral zones.

Var. TURATII, Pini (fig. 58). Reddish ash, unspotted, with red carination; pulmonary orifice margined with bluish gray; sole yellowish white, unicolored.

L. ERYTHRUS, Bourg. Pl. 49, figs. 64, 65.

Carina acute; brownish red, unspotted; shield black-shaded on either side, a little produced in front, more strongly angulated behind; tentacles dark; sole with lateral darker zones.

Length, 5 inches.

*Grande Chartreuse, Savoy.*

Lessona and Pollonera distinguish this from the *L. erythrus* which Pini and themselves consider a var. of *L. cinereo-niger*. I cannot see that it has much character.

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L. SUBALPINUS, Lessona.

Large, coarsely, rugose, the rugæ strong, carinated; shield large, cuneate behind, strongly concentrically rugose, the free anterior portion ample, maculated with white and black; disk thick, zoned with blackish ash-color; carina raised, undulating, about half the length of the dorsum. Length, 6–8 inches.

*Sardinia.*

Distinguished from *L. cinereo-niger* by its shield entirely covered with white and black spots.

Var. TYPUS. Grayish brown, carina whitish, back with three series of white maculations.

Var. GAROCELUS, Lessona and Pollonera. Whitish laterally, maculate with black, back blackish, white-zoned, carina short, black, white-spotted; shield whitish, black-spotted. Length, 2·5 inches.

Var. SIMPLEX, Lessona. Like the type, but dorsally unicolored.

Var. VERONENSIS, Lessona and Pollonera. Ashy olivaceous, with brown maculations or stripes on back and shield; sole brown-margined.

Var. EPOREDIENSIS, Lessona. Black, the shield covered with small white spots. Shell-plate calyptræform, concave, sinistral.

I am not able to figure this species.

L. CORSICUS, Moquin-Tandon. Pl. 48, figs. 59, 60.

Shield finely concentrically rugose, obtusely angulated behind, subgibbose; dorsal line with three or four series of small rugæ; carina variable, from one-third to half the length of the back, red or orange-colored; shield unicolored or with rather obscure lighter maculations towards the margin; never black-spotted; disk with dark marginal zones. Length, 6–16 inches.

*Corsica*, *Riviera*, *Tuscany*, etc.

It is not found at great elevations above the sea, and appears to be principally confined to the vicinity of the coast. It has been confounded with *L. Dacampi*, many of the varieties of which it simulates in coloration, but may be distinguished by its much finer concentric rugæ on the shield, the three or four series

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of dorsal smaller rugæ, the shield less acuminated posteriorly with a less developed free anterior portion.

Lessona and Pollonera enumerate six subspecies (scarcely of varietal importance), and numerous varieties, as follows:—

Subspecies CORSICUS, Moquin-Tandon (*stricto sensu*).

Carina pallid; lateral areas of the disk reddish or reddish orange, margin of pulmonary orifice light colored.

Var. TYPUS, Moquin-Tandon (fig. 59). Light orange ash-color, the carina light reddish brown.

Var. FABREI, Moquin-Tandon. Back brownish, confusedly subzonate, carina lighter colored.

Var. SIENENSIS, Lessona and Pollonera. Shield light chestnut, body subfasciate on the back, carina lighter, lateral zones of the disk carneous.

Subspecies DORIÆ, Bourguignat (fig. 60).

Unicolored, reddish carinate; pulmonary orifice black-margined; lateral zones of the sole brownish or blackish.

Var. SIMPLEX, Lessona and Pollonera. Blackish with the carina blood-red, not reaching the shield.

Var. LINEATUS, Lessona and Pollonera. Differs from the preceding in the red line reaching the shield.

Var. RUBROLINEATUS, Lessona and Pollonera. Like the preceding, but the back with two series of red maculations.

Var. FUSCUS, Lessona and Pollonera. Brownish, carina and two series of rugæ light reddish.

Var. BRUNNEUS, Lessona and Pollonera. Chestnut-brown, carina blood-red.

Var. PALLESCENS, Lessona and Pollonera. Light reddish brown, carina red.

Var. SANGUINEUS, Lessona and Pollonera. Light reddish brown, carina and rugæ red.

Subspecies ISSELII, Lessona.

Back maculated with black, carina red; shield unicolored; pulmonary orifice black-margined, rarely light-margined.

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Var. SERIATUS, Lessona and Pollonera. Shield reddish brown; back whitish, the rugæ and carination reddish, seriately black-spotted.

Var. ARTHURI, Lessona and Pollonera. Shield reddish brown; back flesh-red, confusedly zoned with black and reddish rugæ.

Var. ZONATUS, Lessona and Pollonera. Shield brown, back with alternate reddish and black zones.

Subspecies CALLICHROUS, Bourguignat.

Carina red; shield brownish with lighter spots; pulmonary orifice black-margined.

Var. VERSICOLOR, Lessona and Pollonera. Yellowish, with two blackish zones, and a few black spots around the margin; shield blackish, with wine-colored spots.

Var. HYBRIDUS, Lessona and Pollonera. Brownish, carina red, dorsal rugæ red, disposed in zones; shield blackish with indistinct wine-colored maculations.

Subspecies GESTRI, Lessona.

Carina yellowish or orange, back maculated with black; shield unicolored; pulmonary orifice black-margined.

Var. NIGROZONATUS, Lessona and Pollonera. Shield yellowish ash, back brown, carina and dorsal zone orange, almost reaching the shield, with two black zones.

Var. PULCHER, Lessona and Pollonera. Shield yellowish ash, back lighter, carina and a wide dorsal zone reaching the shield sulphur-color, flanks with blackish and sulphur interrupted zones.

Subspecies BONELLII, Lessona.

Back unicolored, with yellow or orange carina; shield unicolored, pulmonary orifice black-margined.

Var. ATERRIMUS, Lessona and Pollonera. Blackish unicolored, carina yellowish.

Var. FLAVONIGER, Lessona and Pollonera. Black, the dorsal zone and carina yellowish, the former in two series.

Var. CITRINUS, Lessona and Pollonera. Olivaceous brown, carina citron-color, half the length of the back.

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Var. OLIVACEOUS, Lessona and Pollonera. Olivaceous brown, carina and dorsal zone to the shield citron-yellow.

L. PEROSINII, Lessona and Pollonera. Pl. 48, figs. 61, 62.

Strongly rugose, rugæ coarse, carinated; shield cuneate behind, concentrically moderately rugose, black-spotted; pulmonary orifice differently colored, not margined; caudal carina half the length of the dorsum, flexuous, reddish or yellowish; locomotive disk dark-margined. Length, 5·5–8 inches.

*Piedmont.*

Insufficiently distinguished from *L. Corsicus* by its black-spotted shield, slight differences in the height and size of the rugæ, in the posterior angulation of the shield, in coloring, and in the absence of a marginal color for the respiratory orifice.

Subspecies CRUENTUS, Lessona.

Carina and rugæ red; shield red with black maculations.

Var. TYPUS. Brownish red, the carina and rugæ reddish, black maculations in four zones on the back; shield covered with irregular black spots.

Var. FORMOSISSIMUS, Lessona and Pollonera. Red, becoming bluish black on the sides; shield with a few black maculations; back with four series of black maculations.

Subspecies MONREGALENSIS, Lessona and Pollonera.

Carina and rugæ yellowish; shield yellow, with black spots.

Var. VENUSTISSIMUS, Lessona and Pollonera (fig. 62). Whitish ash, becoming grayish black on the sides, carina and rugæ sulphur-yellow, shield sulphur-yellow, covered with black maculations; back irregularly quadrizonate with maculations.

L. CŒRULANS, Bielz. Pl. 49, figs. 66–69.

Chocolate-brown, green, blue, or greenish blue, sometimes chocolate, with the shield and rugæ blue, occasionally shaded darker on the sides and posterior part of mantle; sole dark-bordered; carina short and sharp; rugæ strong.

Length, 4·5–6 inches. *Transylvania.*

I unite with this *L. Schwabi*, Frauenfeld (figs. 66, 67), *L. cinereo-niger*, Bielz (not Wolf), and *L. Transsilvanicus*, Heyne-

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mann (figs. 68, 69). Quite a literature has sprung up upon the identity or non-identity of these forms. Despite some small anatomical and external differences, the system of coloration and other characters unite them. Numerous varieties might be named by an enterprising systematist; luckily one only has so far been described.

Var. INCOMPTA, Kimakowicz. Blackish, unicolored.

L. CONEMENOSI, Böttger. Pl. 60, figs. 83, 84.

Something like *L. maximus*, but proportionally stouter, with a shorter carina; color pink-ash, with black spots, whitish on the sole. Length, 62 mill.

*Greece.*

Var. MULTIPUNCTATA, Böttger (fig. 84). The spots smaller and much more numerous.

L. FLAVUS, Linn. Pl. 49, figs. 70, 72; Pl. 50, fig. 76.

Moderately rugose, shortly carinate; amber-colored, yellowish or yellowish green, variegated with brown and white; shield obtusely angulated behind, very finely concentrically striate, yellowish, with round lighter-colored maculations; pulmonary orifice light-margined; disk yellowish white, unicolored; oculiferous tentacles bluish; mucus yellow. Length, 3·5–5 inches.

*Europe.* Introduced into the *United States*, *Australia*, *Buenos Ayres*, *Algiers*, *Syria*, *Madeira.*

This nocturnal species is distinguished by its bluish tentacles, its yellow mucus, and the light-spotted shield. There are a number of synonyms. *L. Companyoi*, Bourg. (figs. 70, 71), of the Pyrenees, is distinguished by a slight difference in the jaw and the posterior angulosity of the shield—which Bourguignat supposes to be rounded in the *flavus*. *L. bæticus*, Mabille, is only distinguished by the absence of the light-colored spots on the back. *L. Deshayesi*, Bourg. (fig. 72), of Algiers (according to Lessona and Pollonera), appears to have been founded on a specimen of which the front portion of the shield has suffered an accident, and the remainder of it is concave instead of being convex. Other synonyms are *L. variegatus*, Drap.; *L. unguiculus*, Brard; *L. umbrosus*, Phil.; *L.* (*Krynickillus*) *maculatus*, Kalenicz. (fig. 76); *L. Breckworthianus*, Lehmann (Australia);

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*L. bicolor*, Selenka (Australia). Mr. Binney writes thus of this species, as occurring in the States of our Atlantic seaboard: "It inhabits cellars and gardens in moist situations in the cities. It is considered noxious to vegetation. It feeds upon the leaves of plants in kitchen-gardens, and upon the remains of the cooked vegetables and bread thrown out from houses. Its most common habitat is in cellars, where it makes its presence most disagreeable by attacking articles of food, and especially by insinuating itself into vessels containing meal and flour. The young suspend themselves by a thread of mucus. The period of its introduction is not known. It was noticed by Mr. Say more than fifty years ago."

The following merely nominal varieties are given by Lessona and Pollonera:—

Var. FLAVESCENS, Fér. Yellowish, maculations but little conspicuous.

Var. RUFESCENS, Moquin-Tandon. Orange-brown, maculations faint.

Var. VIRESCENS, Fér. Greenish gray, maculations faint.

Var. MACULATUS, Moquin-Tandon. Brownish, with black maculations.

Var. TIGRINUS, Pini. Yellowish brown, variegated with black; shield with large black maculations posteriorly, carina and dorsal line yellowish brown.

Var. COLUBRINUS, Pini. Yellowish, with yellow and black maculations.

L. RAYMONDIANUS, Bourg. Pl. 49, fig. 73.

Shortly carinate, brownish black, becoming yellowish brown on the margins, foot light yellowish ash; back rather finely reticulated; shield smooth or lightly granular, oblong, rounded at the extremities. Length, 3 inches.

*Algiers.*

L. VALENTINIANUS, Fér. Pl. 49, figs. 74, 75.

Reddish brown, back and shield with two pale, broad-edged black streaks; dorsal keel white, shield short, rather truncated behind; respiratory orifice posterior.

*Valencia, Spain*, in gardens.

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L. CALENDYMUS, Bourg. Pl. 50, fig. 77.

Dorsal rugosities stronger than in *L. flavus;* bluish ash on the back, changing to bright orange on the sides; foot yellowish, fringed on the sides with small reddish lines.

*Madeira.*

It is founded on a figure in Albers' work intended to represent *L. variegatus* (= *L. flavus*). The colors appear to be exaggerated in brightness.

L. CANARIENSIS, d'Orb. Pl. 50, fig. 78.

Rugose, almost without carina, shield irregularly rugose; whitish gray, maculated on back and shield with black.

Length (contracted), 2·2 inches.

*Canary Islands.*

May be a variety of *L. maximus* or *L. cinereo-niger;* the coloring of the locomotive disk not being given.

L. MONTICOLA, Böttger. Pl. 50, fig. 79.

Dark brown, unicolored, sole unicolored; shield small, rounded behind; carina rather low, not much compressed.

Length, 28 mill. (in alcohol).

*Armenia*, elev. 8000 feet.

Described from a single specimen.

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L. VIRIDIS, Morelet. Pl. 50, fig. 80.

Blackish green, perfectly smooth, tail obsoletely carinated; shield small, narrow; pulmonary orifice median; tentacles blackish; locomotive disk livid.

*Portugal.*

L. NITIDUS, Morelet.

Blackish, finely longitudinally rugose; shield smooth, shining, elongate-rounded, gibbose; respiratory aperture rather posterior; sole reddish. Shell thin, elliptical, slightly convex, concentrically striated, concave and subcrystalline beneath.

*Portugal.*

Unfigured.

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L. OLIVACEUS, Gould. Pl. 50, fig. 81.

More or less carinated; color dark olive, inclining to purplish or mahogany on the back, paler on the shield and margins, ten-

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tacles dark slate-color, surface minutely obliquely reticulated with very delicate lines; shield short and rounded, concentrically lineated, evidently containing a calcareous rudiment, the respiratory orifice situated at the posterior fourth; head small, front reticulated; ocular tentacles very long and slender.

Length, 2·5 inches.

*Parametta, N. S. Wales.*

L. FULIGINOSUS, Gould. Pl. 50, fig. 82.

Sharply carinated, especially posteriorly; color uniform sooty black; shield oval, moderate in size, broadest behind, showing traces of an internal shell, respiratory orifice at the posterior third; surface coarsely reticulated by oblique fissures, the included areas being more minutely reticulated with smaller fissures; head small, tentacles rather short, ferruginous at tip; foot projecting slightly beyond the edge of the mantle, which is transversely and rather distantly lineated. Length, 2·5 inches.

*Bay of Islands, N. Zealand* (among turnips in a garden).

This is possibly an Amalia, the description and figure being insufficient to determine its generic position. Tate thinks it may = the unfigured *Milax antipodarum* of Gray.

L. JALAPENSIS, Strebel. Pl. 50, figs. 83–85.

Brownish flesh-colored, the tentacles black, on the shield a few irregular black spots, and concentric rugæ. Length, 23 mill.

*Jalapa, Mexico.*

L. BEHRENDTI, Strebel. Pl. 50, figs. 86, 87.

Tail without carina; shield finely concentrically rugose, the large anterior portion finely granular; grayish brown, with black streaks, the shield blackish, sole light brown, the middle zone somewhat grayish. Shell quadrangular oval, keeled on the left side, with scarcely apparent growth-lines, resembling Amalia.

*Coban, Guatemala.*

Section LEHMANNIA, Heynemann, 1863.

L. MARGINATUS, Müller. Pl. 50, fig. 88.

Smooth, watery, subpellucid, moderately rugose, attenuated and carinated behind; ash-colored, brownish on the back, with a median white zone, often margined with blackish; shield obtusely angulated behind, very finely concentrically striated,

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yellowish ash, often brownish in the middle, with dark lateral zones, pulmonary aperture posterior, light, usually brown-margined; sole thin, pallid, unicolored; mucus watery, very copious. *Europe, Iceland.*

The synonyms include *L. sylvaticus*, Goldfuss; *L. scandens*, Normand; *L. scopulorum*, Fab.; *L. flavescens*, Clark; *L. glaucus*, Clark; *L. salicium*, Bouillet; *L. limbatus*, Held; *L. arborum*, Bouch.; *L. Livonicus*, Schrenck; *L. scandens*, Norm.; *L. roseus*, and *L. coloratus*, Brœck; *L. altilis*, Fischer; *L. Helveticus*, Bourg.; *L. Dianæ*, Kimakowicz; *L. Heynemanni*, Bielz. Some of the above have been described as varieties, to which may be added the following from Lessona and Pollonera's monograph:

Var. TYPUS (*L. arborum*, Bouch.). Violet ash, bluish ash or brownish, with a median light zone, carina short; shield with two dark zones.

Var. NEMOROSUS, Baudon. Like the preceding but with two dorsal dark zones in addition, usually maculated on the sides.

Var. BETTONII, Sordelli. Like the preceding, but maculated additionally with brown and white on the back; shield with a median brown zone and alternating whitish and brown zones on the sides.

Var. ALPESTRIS, Lessona and Pollonera. Smaller, with longer carina, back unicolored with a light median zone; shield often with confused blackish zones.

Var. PALLENS, Lessona and Pollonera. Light colored, with a lighter small zone, and longer carina; shield light colored with obscure zones.

Var. RUPICOLA, Lessona and Pollonera. Small, blackish, with or without an obsolete dorsal zone; carina long.

*L. Mongianensis*, Paulucci, described as a variety, has been separated as a species by Lessona and Pollonera. It cannot be distinguished from *marginatus* externally, its characters being anatomical.

L. ECARINATUS, Böttger. Pl. 50, fig. 89.

Resembling *L. marginatus*, but the shield shorter, broader, almost without caudal carina, concolored, rugæ smaller, shorter,

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more granuliform, and differing in color—which is ash-black, lighter on the shield, the sole brownish. Length, 1·5 inches.

*Kutais, Mingrelia.*

Section IBYCUS, Heynemann, 1862.

L. FISSIDENS, Heynemann. Pl. 54, fig. 76.

Animal (in alcohol) not described, except that the shield covers the anterior half of the body, the pulmonary orifice appearing to be anterior. The shell was broken, but was horny-leathery in texture, transparent, amber-colored, shining, with growth-lines.

*Sikkim, Himalayas;* alt. 5600 feet.

Section AGRIOLIMAX, Malm, 1870.

L. AGRESTIS, Linn. Pl. 50, figs. 90–94; Pl. 51, figs. 95–98.

Rugose, rugæ rounded; elongate; tail narrow, shortly carinated; shield large, posteriorly rounded, subangulated, concentrically rugose; pulmonary orifice posterior, rounded, light margined; neck longitudinally bisulcate, with oblique lateral grooves, tentacles elongated, subcylindrical, with small ocular bulbs; color whitish, gray, yellowish brown or reddish brown, unicolored or sparsely or closely maculated with brown, neck and head reddish brown or blackish; sole pallid, grayish diaphanous in the middle; mucus milky. Length, 1·2–3 inches.

*Europe, Iceland, Azores, Madeira, Algiers, Caucasus, Eastern United States, ? Japan, New Zealand.*

"This slug," writes Jeffreys, is a great pest in the kitchen-garden, and does not even spare succulent leaves and roots of flower-plants. Mr. Whiteaves says that it also feeds on earth-worms. Its slime is abundant and viscous, feeling like a lump of sticky fat. Müller states that when it is touched it draws in its horns and remains all day as if it were dead, but in the evening it recovers itself. It is extremely prolific, producing several families, averaging fifty each, in the course of the breeding-season, viz., from April to November. According to Leuch, a German naturalist, a pair of these slugs have been known to lay 776 eggs. These eggs have retained their vitality and the young have been developed from them after having been dried eight times successively in a furnace. It has the same

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faculty as *L. arborum*, of letting itself down from one branch of a tree to another or to the ground, by means of a slimy thread. Mr. Norman informs me that in the earlier part of the year this slug is usually creamy white or light-drab, that as the summer passes away it assumes a darker hue, and brown flakes are more or less thickly scattered over the surface; and that during the autumn it is frequently of a rich brown color."—*Brit. Conch.*, i, 134.

Introduced from Europe, it has become a common species in the States of our Atlantic seaboard; a considerable number often congregating in the same retreat, whence they sally in the night to feed. Binney observes that: "Their growth is rapid, the animal excluded from the egg in the spring arriving at maturity, and producing eggs before the succeeding winter. They defend themselves from injurious contact by instantly secreting, at the part touched, a quantity of milky white, glutinous mucus. They are active in their motions, and soon escape when disturbed. Suspending themselves head downwards, they lower themselves from plants and fences by forming a mucous thread by which they attach to the point from which they hang. They are occasionally seen in this situation in rainy weather. During the process of excreting the mucous thread, the alternate undulating expansions and contractions of the locomotive band of the foot are seen to take place, in the same manner as when they are in motion on a plane surface."—*L. and F. W. Shells*, pt. 1, 64.

The synonymy includes *L. obliquus*, Brard; *L. tunicatus*, Gould; *L. Mentonicus*, Nevill; *L. Niciensis*, Bourg.

The remarks upon the change of color in these slugs, quoted above from Jeffreys, show how little value is to be attached to color varieties. The following are given by Lessona and Pollonera:—

Var. TYPUS (var. *albidus*, Pini). Ash-colored, head and tentacles brownish (fig. 92).

Var. FILANS, Hoy (fig. 91). Whitish, shield yellowish.

Var. AURATUS, Lessona. Animal unicolored, yellowish, tentacles black.

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Var. RUFESCENS, Pini (fig. 93)= var. *ornata*, Paulucci. Yellowish or reddish brown, with a few dark spots and maculations.

Var. RETICULATUS, Müll. (fig. 94). Brownish, with darker spots on the shield, and linear dark maculations or reticulations on the body.

Var. TRISTIS, Moquin-Tandon (fig. 95). Unicolored brownish, shield sometimes subfasciate.

Var. VERANYANUS, Bourg. (fig. 96). Ash-colored, with small black punctations.

Var. FLORENTINUS, Lessona and Pollonera. Larger, whitish, elegantly maculated with brownish black.

In addition to the above there are varieties *obscurus*, *lilacinus*, and *ornatus*, Moquin-Tandon; *punctatus*, *nigricans* and *varians* of Westerlund; *succineus*, Müller; *minutus*, Kalenicz. (fig. 97), from the Caucasus; *saxorum*, Baudon; *falvus*, Normand (=*ornatus*, Moq.); *sylvaticus*, Drap.; *nemorosus*, Mabille.

It is useless to attempt to correlate these various forms.

*L. varians*, A. Adams (unfigured), from Japan, and *L. molestus*, Hutton, New Zealand, are probably both to be included here.

*L. Dymczeviczii*, Kaleniczenko (fig. 98), is, as Lessona and Pollonera remark, "as like as two drops of water to *L. agrestis*," and notwithstanding some small differences in dentition I am disposed, for the present, to consider it a synonym.

L. PALLIDUS, Schrenck. Pl. 51, fig. 99.

Small, moderately rugose, attenuated behind, plainly but shortly carinate, the carina subtruncate; shield large, subgibbose, rounded behind; pulmonary aperture posterior, light margined, with a brown zonule above it; color light ash or ochraceous, unicolored, or brown-maculated; tail, shield and neck yellowish; oculiferous tentacles brownish; sole whitish, grayish diaphanous in the middle; mucus watery. Length, 1–1·5 inches.

*Norway*, *Livonia*, *Northern Italy*.

Considered by several good conchologists a variety of *L. agrestis*. Lessona and Pollonera distinguish it by its smaller size, uncolored and transparent mucus, and by characters of its dentition and anatomy; its habitat is also different, preferring forests and shaded, humid localities.

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*L. Norvegicus*, Westerl.; *L. agrestis*, Lindström, and probably *L. filans*, Sordelli (non Hoy), are synonyms.

Var. IMMACULATUS, Pollonera and Lessona. Pallid, without maculations; shield often yellowish.

Var. FUSCONOTATUS, Pollonera and Lessona. Pallid or yellowish brown, maculated or reticulated with brown.

L. PANORMITANUS, Lessona and Pollonera. Pl. 51, fig. 100.

Attenuated behind, carina distinct, short, abruptly subtruncate; shield large, not gibbous, angulated behind, smooth (in alcohol); pulmonary orifice posterior, pallid margined; lateral zones of sole very plainly transversely sulcate; brownish olivaceous, shield darker, sole pallid, unicolored. Length (in alcohol), 1·2 inches.

*Palermo, Sicily.*

The shield is less developed in front, the carina truncate, and the dentition and reproductory organs differ slightly from *L. agrestis*, of which it should, perhaps, form a variety.

Var. PONSONBYI, Clessin. Back and shield covered by numerous small blackish brown maculations. *Gibraltar.*

L. MELANOCEPHALUS, Kaleniczenko. Pl. 51, fig. 10.

Larger than *L. agrestis*, with longer neck, keel much less conspicuous, and the same color or but little lighter than the rest of the back; dark brownish gray, unspotted, the mantle brown-tinged, the head and neck black; sole light brownish gray.

Length, 2–3 inches.

*Caucasus.*

L. JICKELII, Heynemann. Pl. 51, fig. 14.

Brownish gray, only keeled towards the tail, lighter on the sides; shield minutely granular, nearly smooth; sole nearly the same color as the sides. Shell thin and fragile, shining, the apex plainly on the left side. Length (in spirits), 15 mill.

*Abyssinia* (alt. 6000 feet).

L. ARGENTINUS, Strobel. Pl. 51, figs. 11, 12.

Brownish ash-colored, slightly rugose, ocular tentacles ashy black, shield concentrically sulcate, back but slightly carinated. Length, 33 mill.

*Argentine Republic.*

*L. meridionalis*, Döring, is a synonym.

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(MALACOLIMAX, Malm.)

L. TENELLUS, Nilsson. Pl. 51, figs. 2–7, 13.

Small, with regular dorsal rugæ, very shortly carinated, yellowish ash, unicolored; shield rather small, rounded behind, yellowish, unicolored or longitudinally zoned with brown on either side; tentacles blackish; sole pallid, unicolored; mucus watery or luteous. Length, 18–30 mill.

*Europe.*

The synonyms are *L. tenellus*, Schrenck; *L. cereus*, Held; *L. aureus*, Gmel.

Var. SQUAMMATINUS, Morelet (fig. 5). Golden green, becoming bluish on the sides, quadrifasciate, lateral lines parallel, dorsal converging into one anteriorly. *Portugal.*

Var. XANTHIUS, Bourg. (figs. 6, 7). Yellowish or greenish orange, foot whitish yellow. *Ems, Germany.*

L. CAMPESTRIS, Binney. Pl. 51, figs. 8, 9.

Color usually various shades of amber, without spots or markings, sometimes blackish; head and eye-peduncles smoky; body cylindrical, elongated, terminating in a very short carina at its posterior extremity; mantle oval, fleshy, but little prominent, with fine concentrical lines; back covered with prominent elongated tubercles and furrows; foot narrow, whitish; respiratory foramen on the posterior dextral margin of the mantle; mucus thin, watery. Length, 1 inch.

*United States.*

Although considerably smaller, it is nearly allied to *L. agrestis*, but the surface possesses a peculiarly gelatinous or semi-transparent consistency, the rugæ are more prominent and are not separated by darker-colored anastomosing lines; it does not secrete a milky mucus. It is active in its motions, and occasionally suspends itself by a mucous thread. Most common in the Northern and Middle States, found under decaying wood in forests and in open pastures, and under stones at roadsides.

Var. *occidentalis*, Cooper, of California, appears to differ only slightly in its dentition. *L. montanus*, Ingersoll, which also differs slightly in the details of dentition may likewise need to be placed here as a variety only, as W. G. Binney surmises. *L. Weinlandi*, Heynemann, is probably a synonym.



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L. MONTANUS, Ingersoll.

Color bluish gray; form stout, with blunt posterior extremities. Length, 1 inch.

*Hot Sulphur Springs, Colorado.*

*L. Ingersolli*, W. G. Binney, is identical.

Var. CASTANEUS, Ingersoll.

Small and slender; length less than an inch; color a lively brown, with a dark spot over the shield; head, tentacles and eye-stalks black; bottom of foot white.

*Blue River Valley, Colorado.*

*L. montanus* may be a variety of *L. campestris*, from which it differs somewhat in dentition and genitalia. It is unfigured.

Section PARALIMAX, Böttger, 1883.

L. INTERMITTENS, Böttger. Pl. 51, figs. 15, 16.

Carinate, shield short, obtusely angulate behind, closely rugose, pulmonary orifice anterior; grayish brown, becoming yellowish on the sides; shield with three longitudinal black zones, its sides and those of the body black-spotted, often with a single zone on the middle of the shield, rarely all of them evanescent, disk yellowish, unicolored. Length, 27 mill.

*Kutais, Mingrelia.*

L. NYCTELIUS, Bourg. Pl. 52, fig. 17.

Graceful, elongate, cylindrical, shortly carinate behind, back lightly reticulate, wine-brown, lighter on the sides, with two lateral black lines, foot obscure yellowish brown; shield oval, rounded at either extremity, wine- or ruby-brown, with two black zones. Length, 1 inch.

*Algiers.*

It is *L. agrestis*, Terver.

Section CLYTROPELTA, Heynemann, 1867.

L. ASCENSIONIS, Lesson. Pl. 52, figs. 19, 20.

Pale fulvous; edge and under side of foot yellow; lead-colored behind; shield broad, oval, place of the shell marked by a convexity. Length, 2 inches.

*Ascension Island.*

A variety is nearly black above.

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*Limax perlucidus* of Quoy and Gaimard, is placed in this group by Heynemann. It belongs to the genus Hyalimax (Succineidæ).

Section KRYNICKIA, Kaleniczenko, 1839.

(Group *Malino*, Gray).

L. LÆVIS, Müller. Pl. 52, fig. 21.

Scarcely carinated, soft, brownish, black-dotted; shield equaling the dorsum in length, lightly concentrically striated, gibbous, posteriorly rounded; pulmonary orifice very posterior; head blackish; sole brownish; mucus watery. Length, 20 mill.

*Middle and Northern Europe, Northern Italy.*

The synonyms are *L. brunneus*, Drap.; *L. arenarius*, Gassies; *L. parvulus*, Normand.

Var. MUCRONATUS, Westerlund. Yellowish brown, pallid on the sides, sole white; shield with a posterior conical process. Length, 10 mill. *Sweden.*

L. BRONDELIANUS, Bourguignat. Pl. 51, fig. 1.

Elongated cylindrical, rather small, shortly carinate behind; blackish, yellowish gray below, elongately reticulated; ocular tentacles blackish, minutely tuberculated with black; shield large, long, not adhering in front, dilated, rounded before and behind, concentrically striulate. Length, 1·7 inches.

*Algiers.*

Said to resemble the section Krynickia by its very posterior orifice, and shield only adhering behind. The animal can thus withdraw its head completely beneath the fore-part of the shield. No differential characters are given from *L. agrestis*, of which it may be a variety.

L. LOMBRICOIDES, Morelet. Pl. 52, figs. 22, 23.

Yellowish pink, with black dots, tail subcarinate; mantle long, very contractile in front, the front half concentrically, the back part obliquely striate. Length, 1·5 inches.

*Portugal.*

This belongs to the group Malino, characterized by the striæ of the mantle, as given above.

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(Group *Malinastrum*, Mabille.)

L. EUSTRICTUS, Bourg. Pl. 52, figs. 24, 25.

Large, posteriorly carinated, smoky ash-colored, with brownish-black maculations or reticulations, with a lateral interrupted black line on either side; shield large, angulate behind, concentrically rugulose. Length, 5 inches.

*Syria.*

Section MEGAPELTA, Mörch, 1857.

L. SEMITECTUS, Mörch. Pl. 52, fig. 27.

Black, acuminate behind, head and tentacles light yellowish, shield concentrically rugose, oval, more than half the length of the body. Length, 2 inches. *Central America.*

Described from a colored drawing.

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L. GUATEMALENSIS, Crosse and Fischer. Pl. 52, figs. 28, 29.

Scarcely carinate, bluish black, shield darker colored, with vermiform sulcations; sole pallid. Length, 15–18 mill.

*Guatemala.*

The specimens were in a bad state of preservation, so that the diagnosis could not be completed. Although much smaller, the authors remark that it may be a variety of the preceding species, and that it differs but little from the next—mainly in the central tooth of the lingual series being plainly tricuspidate in this species and only obscurely tricuspidate in *L. Americanus*.

L. AMERICANUS, Tate. Pl. 52, figs. 30, 31.

Gray, with black in the grooves, giving the general appearance of a brownish black, head and tentacles lighter colored; shield brownish black and smooth, free as far as the respiratory orifice; edge of foot with defined crenulated border; foot gray, three-zoned; shell represented by a thin semiopaque membrane.

*Chontales, Nicaragua.*

See remarks upon preceding species.

L. STENURUS, Strebel. Pl. 52, figs. 18, 26.

Shield full in front, very minutely granulated, appearing smooth without a glass, no concentric sulcæ; brownish gray, darker on the shield, lighter on the sides, sole light brown.

*Mexico.*

Appears to resemble the preceding species.

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*Unfigured or Undetermined Species of Limax.*

L. MARTINIANUS, Bourg. *Maritime Alps of France.*
L. VERSICOLOR, Hazay. *Hungary.*
L. CRISPATUS, Baudon. *France.*
L. NUBIGENUS, Bourguignat. *Pyrenees.*
L. MONTENEGRINUS, Böttger. *S. W. Montenegro.*
L. BIELZII, Seibert. *Carpathian Mts.*
L. BOCAGEI, Silva. *Portugal.*
L. ALPINUS, Fér. *Europe.*
L. CINEREO-IMMACULATUS, Olafs. *Iceland.*
L. GRACILIS, Rafinesque. *Kentucky, U. S.*
L. HYPERBOREUS, Westerlund. *Siberia.*
L. GYRATUS, Westerlund. *Ronneby, Sweden.*
L. GYRATUS, var. BERGENSIS, Westerlund. *Bergen, Norway.*
L. NIGER, Malzine. *Belgium.*
L. TAYGETES, Desh. *Greece.*
L. EHRENBERGI, Bourg. *Syria.*

This species occurs in the text of Kobelt's Catalogue, but not in the index, where it is replaced by the following, for which it was probably intended, as no such species occurs in the work cited.

L. PHŒNICIACA, Bourg. (See remarks above). *Syria.*
L. FEDTSCHENKOI, K. and H. *Turkestan.*
L. MELITENSIS, Lessona and Pollonera. *Malta.*
L. MORAVICUS, Ehrenb. *Moravia.*
L. HYALINUS, Linn. (Probably young). *Europe.*
L. KEYSERLINGI, Martens. *Astrabad, Armenia.*
L. LINEOLATUS, Risso. *Nice.*
L. VIRESCENS, Schultz (*L. Schultzii*, Bivona). *Sicily.*
L. PYCNOBLENNIUS, Bourg. *Pyrenees.*
L. MILLEPUNCTATUS, Pini. *Italy.*
L. SANTORINUS, Letourneux. *Isle Santorin, Grecian Archip.*
L. COLLINUS, Normand. *France.*
L. MAJORICENSIS, Heynemann. *Ins. Majorca.*
L. (KRYNICKIA) LACUSTRIS, Bonelli. *Northern Italy.*
L. (KRYNICKIA) HEYDENI, Heynemann. *Engadine, Denmark, Sweden.*
L. BERYTENSIS, Bourg. *Syria.*

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L. (KRYNICKIA) BOURGUIGNATI, Mabille. *Versailles, France.*
L. (KRYNICKIA, MALINASTRUM) CYRNIACUS, Mabille. *Corsica.*
L. (KRYNICKIA, MALINASTRUM) SUBSAXANUS, Bourg. *Algiers.*
L. (KRYNICKIA) MAURELIANUS, Bourg. *Nice.*
L. (PARALIMAX) VARIUS, Bourg. *Caucasus.*
L. MEGASPIDUS, Blainv. *Hab. unknown.*
L. CAPENSIS, Krauss. *Cape of Good Hope.*
L. KRAUSSIANUS, Heynemann. *Cape of Good Hope.*
L. LEGRANDI, Tate. *Tasmania.*
L. MOUENSIS, Gassies. *N. Caledonia.*
L. MEMNON and L. BENGALENSIS, Theob. (not described). *India.*
L. RAROTONGENSIS, Heynemann. *Cook's Is., Polynesia.*
L. MEGALODONTES, and L. MAURUS, Quoy and Gaimard. *Port Jackson, Australia.*
L. CAMPESTRIS, Krauss, H. and A. Adams, Genera, 219 (Krauss described no such species, but *L. Capensis*) = L. KRAUSSII, Ads.
L. KRAUSSI, Ads. (for *campestris*, Kr., according to H. and A. Ad., preoccupied). *Cape of Good Hope.*
L. NATALENSIS, Krauss, H. and A. Ad., Genera, 219=Vaginulus.
L. BRASILIENSIS, Semper. (Like a young *L. agrestis*, but with anatomical differences.) *Brazil.*
L. ÆQUINOCTIALIS, d'Orbigny. *Guayaquil, Ecuador.*
L. ANDECOLUS, d'Orb. (alt. 3700 metres). *Paz, Andes of Bolivia.*
L. CHILENSIS, Gay. *Chili.*
L. COBANENSIS, Crosse and Fischer. *Coban, Guatemala.*

## Genus AMALIA, Moquin-Tandon, 1855.

A. MARGINATA, Drap. Pl. 52, figs. 32–34; Pl. 54, fig. 60.

Yellowish, flesh-color, or wine-brown, becoming lighter on the sides, minutely black-dotted; shield similarly colored, laterally zoned, truncate or slightly emarginate behind, the sulcus oval, rounded in front, acutely angulated next the pulmonary orifice; orifice posterior, pallid, finely black-margined; sole unicolored.

Length, 2–2·5 inches.

Shell-plate oblongate, thin, slightly convex above; concave below, apex not very prominent, concentrically striate. *Middle and Southern Europe.*

It is *A. cristata*, Lieblein; *A. Eichwaldi*, Kalen. (fig. 34).

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Var. RUSTICA, Millet. Smaller, grayish, carina whitish. *A. affinis*, Millet is a synonym.

Marchioness Paulucci has recently described vars. *fulva* and *Mongianensis*, both from Calabria, the former of which may be a var. of the next species. Several of the succeeding species would, I think, have been better treated as varieties; however, I yield to general opinion.

A. CARINATA, Risso. Pl. 52, figs. 35–39.

Distinguished from the preceding species by its larger size, by the black-tinted sulcus of the shield, by the lateral zone not being prolonged anteriorly beyond the sulcus, and by the short black lines between the rugæ of the back. Length, 3–5 inches. *Southern France, Italy.*

*Limax argillaceus*, Gassies (unfigured), and *L. Sowerbyi*, Fér. (fig. 39), may be considered synonyms. The latter is sometimes adopted as the name of a species including *L. argillaceus*, and *L. carinatus*, Leach, non Risso, but I cannot find any valid characters for its separation.

Lessona and Pollonera consider *A. marginata*, var. *fulva*, Paulucci, the young state of a typical *A. carinata*. They describe the following varieties:—

Var. TYPUS. More or less brownish, the dark lines of the back distinct, shield-sulcus black.

Var. PALLIDISSIMA. Like the preceding, but light colored.

Var. INSOLITA. Like the preceding, but shield-sulcus not black.

Var. ORETEA. Typical, but with a central black zone on the shield.

Var. CASERTANA (figs. 37, 38). Powdered with black dots, the dorsal black lines obsolete; shell-plate thick, flattened above, irregularly convex below.

A. TYRRENA, Lessona and Pollonera. Pl. 53, figs. 41–43.

Whitish, with very small brown dots on the back and shield, dorsal sulci blackish, shield gibbous, emarginate behind, with a rounded black sulcus, angulated in front and on the right side; carina whitish, flexuous at the tail; head and tentacles blackish; sole with dark median and lighter lateral zones.

Length (in alcohol), 22–23 mill. *Naples.*

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Smaller shield, less gibbose, carina more pronounced and flexuose than the preceding species; also distinguished by the color of the sole.

A. ETRUSCA, Issel. Pl. 53, fig. 44.

Rugose, strongly carinate, the carina acute, triangular, flexuous; shield large, moderately granulate, emarginate behind, the sulcus black, subpentagonal, longer than wide, moderately produced in front, acutely angulate above the pulmonary orifice, blackish, with lighter dots near the margin, laterally obsoletely bizonate; orifice posterior, pallid margined; general color brownish, reticulated with black, blackish on the back, carina black; sole brownish, the lateral areas becoming blackish behind.

Length (in alcohol), 31 mill.

*Tuscany.*

A. PYRRICHUS, Mabille. Pl. 53, fig. 40; Pl. 54, fig. 61.

Brownish yellow, the carina yellowish white, subacute, with small black dots; head and tentacles blackish, sole dirty white; shield truncate behind, black-grooved on either side of the shell-plate. Length, 2–2·5 inches.

*France.*

Distinguished from *A. marginata* in form and coloration, the shield-sulcus hardly visible, the carina less distinct, the jaw with distinctly striate extremities—that of *A. marginata* being smooth. It is *L. marginatus* of Moquin-Tandon, in part.

A. GRACILIS, Leydig. Pl. 53, fig. 45.

Narrow, graceful, varying in color from dirty ochre to blackish (or yellowish gray with blackish lines), lighter on the sides, carina dirty yellow, sole blackish gray, shield without the black sulcus-markings of *A. carinata*. Length, 1·5–2 inches.

Shell very small, long and narrower than in *A. carinata*,

*Eastern Germany, Hungary.*

The synonyms are *A. marginata*, and *A. Cibienensis*, Kimak., and *A. Budapestensis*, Hazay.

A. INSULARIS, Lessona and Pollonera. Pl. 53, figs. 46, 47.

Coarsely rugose; carina acute, triangular, undulated, whitish on the top; shield moderate, coarsely granulated, profoundly emarginate behind, with a pentagonal black sulcus, produced in

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front and acutely angulated on the right side; ochraceous, becoming blackish on the back; shield ochraceous, with blackish maculations, thicker in the middle; sole ochraceous, unicolored.

Length (in alcohol), 35 mill.

*Sardinia* and *Sicily.*

Said to be distinguished from all preceding species by characters of its reproductory organs; externally differs from *A. carinata* by its more elevated carina, and smaller shield granulations.

A. Doderleini, Lessona and Pollonera. Pl. 53, figs. 48–50.

Moderately rugose, yellowish brown, becoming blackish on the back and shield; carina acute, blackish, pallid on the top; back obliquely sulcate with black; shield emarginate behind, very minutely granular, sulcus oval elongated, black, acutely angulated on the right side; sole pallid, unicolored.

Length (in alcohol), 35 mill.

*Palermo, Sicily.*

A. Hessei, Böttger. Pl. 60, figs. 85, 86.

Intermediate between *A. marginata*, Drap., and *A. gagates*, Drap., the tail more acute than in the former, more obtuse than the latter; dirty yellowish brown, the shield with a $\omega$-shaped or irregular dark marking; middle field of sole double the width of either side zone. Length, 19 mill.

*Epirus, Corfu.*

A. Sicula, Lessona and Pollonera. Pl. 53, figs. 51, 52.

Large, moderately rugose and carinate, yellowish brown on the sides, blackish on the back and shield; carina acute, black; shield posteriorly emarginate, unicolored, sulcus subpentagonal; head and tentacles blackish; sole pallid, unicolored.

Length (in alcohol), 45 mill.

Shell-plate rather thick, oval oblong, subirregular, whitish, the nucleus not prominent.

*Palermo, Sicily.*

A little larger than the other Italian species, it is distinguished from *A. gagates* by its less granular shield, appearing as though somewhat transversely striated, and by its shell, which has the posterior fosset which Bourguignat has made a character of his section Sansania.

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A. GAGATES, Drap. Pl. 53, figs. 53, 54.

Elongated, graceful, minutely rugose, distinctly carinated; blackish, lead-colored or olivaceous, not maculated, lighter colored on the sides, carina rarely lighter; shield minutely granular-subrugose, posteriorly emarginate, with a profound elongated subpentagonal sulcus; head and tentacles blackish; sole unicolored, or with darker lateral zones. Length, 2·5–3·5 inches.

*Southern Europe, N. Africa, St. Helena* and *Madeira* (introduced).

Var. TYPUS. Black, the sole pallid unicolored, or with black margin.

Var. OLIVACEA, Moquin. Brownish olivaceous, unicolored, sole pallid or olivaceous.

Var. BEDRIAGÆ, Lessona and Pollonera. Black, the sole with blackish lateral zones.

Var. BENOITI, Lessona and Pollonera. Black, with white carina.

A. ICHNUSÆ, Lessona and Pollonera. Pl. 53, fig. 55.

Differs from *A. gagates*, which it resembles in color and general features, in its smaller size and weaker carina, and in the median zone of the sole being dark and the lateral zones pallid.

Length (in alcohol), 30–35 mill.

*Island of Sardinia.*

A. SCAPTOBIUS, Bourg. Pl. 53, fig. 56.

Long and narrow, strongly carinate, posteriorly acute; back lightly reticulated, sordid whitish or grayish; sole whitish; shield oval, bipartite, subgranular, grayish with darker spots.

Length, 25 mill.

*Algiers.*

Heynemann considers this = *M. gagates*, Drap.

A. EREMIOPHILUS, Bourg. Pl. 53, figs. 57, 58.

Yellowish, passing into bluish on the flanks; shield bipartite, granulated, bilobed behind; carina long; disk yellowish ash.

Length, 50 mill.

*Algiers.*

A. BARYPUS, Bourg. Pl. 54, figs. 59.

Bluish ash, lighter on the sides, the rugæ subpentagonal, defined by blackish lines; carina acute, whitish; shield rounded,

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subgranular, bipartite, the sulcus diamond-shaped, black, rest of surface minutely black-dotted; foot yellowish. Length, 43 mill.

*Syria.*

A. MACULATA, K. and H. Pl. 54, figs. 62, 63.

Brownish, with confluent blackish maculations; shield fasciate with black. Length, 15 mill.

*Turkestan.*

A. KALENICZENKOI, Clessin. Pl. 54, fig. 74.

Blackish gray, the shield rounded ovate, irregularly punctate with black; foot blackish gray, the middle zone as wide as the two side zones united. Length, 19 mill. *Crimea.*

Less rugose, darker and with less acute carina than the next species.

A. CRISTATA, Kaleniczenko. Pl. 54, fig. 64.

Olivaceous gray, reticulated with black, back entirely carinate (carina yellowish); head and tentacles black; sole grayish white; mucus dark yellowish.

*Crimea.*

Kaleniczenko quotes *Limax megaspidus*, Blainv., as a synonym; if it were identical it would have priority. Dr. Gray, however, who has examined the original specimen of the latter, states that it is not carinate and is a true Limax, but in such a poor condition that its positive identification is impossible, although it may be a *L. flavus*.

A. DRYMONIUS, Bourg. Pl. 54, figs. 65, 66.

Differs completely from *A. gagates* in its color, bluish or purplish ash, with a very sharp white carina, in its stronger rugosities, more pronounced margins of the foot, more unequal and more gibbous shield, etc.

*Madeira.*

It is *L. gagates* of Albers, not Drap., and *L. agrestis* of Lowe, not Linn.

A. POLYPTYELUS, Bourg. Pl. 54, fig. 67.

Bluish gray, with a darker tint on the back and central portion of shield; carina elevated. Length, 15–20 mill.

*Teneriffe.*

This is *L. carinatus*, d'Orb., not Risso, and *L. cinereus*, Ledru, not Lister.

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A. PECTINATA, Selenka. Pl. 54, figs. 68, 69.

Finely rugose, strongly carinate, shield smooth, rounded, free in front, flattened or slightly emarginate on the posterior margin, bearing a shell-sulcus, under which is a small oval shell, with posterior median nucleus; shield and back blackish brown, foot and head grayish brown. Length (in spirits), 30 mill.

*Sydney, N. S. Wales.*

A. SANDWICHENSIS, Eydoux. Pl. 54, figs. 70–73.

Acuminate behind, obliquely grooved, with a marginal groove surrounding the foot; shield large, finely granular, free in front; brownish black above, whitish below. Length, 20 mill.

*Sandwich Islands.*

The shell-plate is figured with a central nucleus, like a Patella; if the figure is correct, this character might serve for the creation of a new genus. I place the species in Amalia with some reserve because the description is insufficient.

A. HEWSTONI, Cooper. Pl. 54, fig. 75.

Back strongly carinate; mantle granulate-rugose, with a subelliptical groove above the level of the respiratory orifice, which is just behind the middle; color blackish brown, or deep black above, the sides paler, the base of the foot whitish.

Length, 2·5 inches.

*Gardens, in San Francisco, Cal.*

In the remarkable groove on the mantle it differs from others described; this does not coincide with the outline of the attached portion of the mantle, or with the internal plate. It is sometimes scarcely visible (Cooper).

It is possibly an introduced species, as it has only been seen in San Francisco. Dr. Cooper suggests that it may be *L. Sandwichensis.*

Section GIGANTOMILAX, Böttger, 1883.

A. LEDERI, Böttger. Pl. 2, figs. 99, 100.

Rugose; shield anterior, rounded behind; dorsum strongly carinated; central zone of locomotive disk scarcely wider than the lateral zones; blackish, the sides marbled with gray, carina and shield gray. Length (in alcohol), 68 mill.

***Caucasus.***

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### Section EUMILAX, Böttger, 1881.

A. BRANDTI, Martens.

An unfigured species, rugose, with blackish-brown back, carina and shield, the sides with oblique black lines, the shield with black spots, central zone of foot white, marginal zones grayish black. Respiratory orifice anterior. Length, 3 inches.

*Caucasus.*

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*Unfigured Species of Amalia.*

A. KOBELTI, Hesse. *Greece.*

A. NIGRICANS, Schultz. *Sicily.*

Declared by Lessona and Pollonera to be a doubtful species; referred by different authors to *A. marginata* or *A. gagates.*

A. ATRATA, Mabille. *Portugal.*

A. MONTEROSATI, Bourg. *Sicily.*

A. EMARGINATA, Hutton. *New Zealand.*

A. NIGRICOLLUS, Tate. *Tasmania.*

A. TASMANICA, Tate. *Tasmania.*

A. ANTIPODARUM, Gray. *New Zealand.*

## Genus PARMACELLA, Cuvier, 1805.

The development of Parmacella is very remarkable. At first the embryo is enclosed in an operculated spiral shell; then, as it grows larger the mantle is reflected over the margin of the peristome, resembling a Vitrina; subsequent growth of the mantle covers the shell except a small perforation over the nucleus, and the further growth of the shell is secreted from the inner portion of the mantle, forming a plate as in Limax.

The arrangement of the species is taken from a valuable monographic paper by H. Crosse, published in the Journal de Conchyliologie, 329, 1880. Mr. Crosse, who kept individuals in confinement for the purpose of studying their habits, states that they are herbivorous and nocturnal, remaining inactive and concealed during the day, the anterior portion contracted beneath the mantle. The eggs, thirty-four in number, were oval, covered with a thin pellicle, and four millimetres long.

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P. OLIVIERI, Cuvier. Pl. 54, figs. 77–80.

Rugose, body anterior to the shield, with three longitudinal riblets. Color unknown. Length, 2 inches.

*Plains of the Euphrates, Mesopotamia.*

It is *P. Mesopotamiæ*, Oken, and *Testacella ambiguus*, Fér.

P. ALEXANDRINA, Ehrenberg. Pl. 54, figs. 79, 80.

Reddish brown, carinate on the back. Shell stronger and wider than in *P. Olivieri*, entirely olive-green, including the nucleus. Length, 2 inches.

*Alexandria, Egypt.*

The original specimen, collected fifty years ago, and preserved in alcohol in the Berlin Museum, is the only one known. The animal has not been figured.

P. DESHAYESI, Moquin-Tandon. Pl. 54, figs. 81, 82; Pl. 55, figs. 83–85.

Reddish yellow, lighter on the sides, foot yellowish white, or somewhat bluish white; back and acute tail carinated; sides with longitudinal sulci; head and neck rugose, tentacles granular; shield rugose, elongate, rounded at either end.

Shell convex, solid, concentrically striate, rugose below, covered by a very thin epidermis, the nucleus yellowish.

Length, 4–5 inches.

*Algiers, Morocco.*

This is *P. Algerica*, Desh., of Jay's Catalogue. Bourguignat has published its anatomy (Rev. et Mag. Zool., 1861). It was supposed to have been found at Malaga, but *P. Valenciennesii* was mistaken for it.

Fig. 82 represents a young animal with the shell partly exposed.

P. DORSALIS, Mousson. Pl. 55, figs. 86, 87.

Distinguished from the preceding species by the form of the shell.

Animal not described.

*Valleys of Atlas Mts., Morocco.*

P. VALENCIENNESII, Webb and Van Beneden. Pl. 55, figs. 88–92.

Reddish brown or nearly brick-color above, shaded with yellowish gray on the back, and bluish ash on the neck, the sides sillonated, back strongly carinated; shield with blackish spots;

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sole light reddish yellow. Shell narrow, convex, of one-and-a-half volutions. Length, 3·5–4·5 inches.

*Spain* and *Portugal.*

P. MOQUINI, Bourguignat. Pl. 55, figs. 93–95.

Uniform brick-red, the rugosities of the mantle slight, mantle unspotted; back less strongly carinated and tentacles stouter than in the preceding species. The shell is smaller, of a dirty greenish yellow, thinner anteriorly, the nucleus smaller and more oblique.

*Southern France.*

P. GERVAISII, Moquin-Tandon. Pl. 55, figs. 96, 97.

Olive-brown without spots. Nucleus of the shell greenish yellow, very shining, the blade oval, thick and chalky, only three times as large as the nucleus.

*Southern France.*

According to Moquin-Tandon the nucleus of the shell is always exposed in the living animal. Perhaps it is only a color variety (and not adult) of the preceding species, with which it inhabits.

Subgenus CRYPTELLA, Webb and Berthelot, 1833.

The insufficient distinction of this group is in its less distinctly spiral shell. They are inhabitants of the Canary Islands where, during eight or nine months in the year their activity is suspended, and they remain concealed under the large blocks of lava with which these islands are covered. During the rainy season, and especially at night, they quit their retreats and commit great havoc in the gardens. The peasants destroy them by thousands, yet their numbers do not appear to diminish.

P. CALYCULATA, Sowb. Pl. 55, figs. 98–3.

Animal elongated, narrow in front, trisulcate, the middle sulcus larger, tail trigonal, carinate, acute; shield tongue-shaped; olivaceous, with brown spots and streaks, the neck and head bluish, the foot deeper blue. Shell retaining a vestige of the embryonal peristome visible below. Length, 2·5–3·5 inches.

*Canary Islands.*

The spire of the embryonic shell is not apparent. Figs. 99–1, represent the embryo shell and temporary operculum (see p.

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221). It is *P. ambigua*, d'Orb., and *P. Canariensis*, Webb and Berthelot.

*P. auriculata*, Mousson (unfigured), is considered by Wollaston a variety of this species. and *P. callosa*, Mousson (unfigured), is believed by Crosse and Wollaston, following the doubt expressed in the original diagnosis, to have been described from a very old individual—perhaps abnormal.

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*Unfigured and Undetermined Species of Parmacella.*

| | |
|---|---|
| P. RUTELLUM, Hutton. | *Candahar, Afghanistan.* |
| P. VELITARIS, Martens. | *Astrabad, Russian Armenia.* |
| P. CUMINGII, Pfr. | *Isl. Juan Fernandez.* |
| P. GRACILIS, Gray. | *Hab. unknown.* |

The genus, in the two latter species, is very uncertain. It is scarcely possible that a native Parmacella would be found in Juan Fernandez, and as the shell-plate only is described, it probably belongs to some other genus.

## Genus PHOSPHORAX, Webb and Berthelot, 1833.

"It is not without some hesitation that I admit this species into the Canarian catalogue; because M. d'Orbigny, on whose authority it would seem to have been originally introduced (in 1819) into Férussac's work, makes no allusion to it whatsoever in his subsequent enumeration (in 1839) of the Mollusca of the Canaries. It is highly probable, therefore, that he had some actual reason for supposing that either the diagnosis or the asserted habitat was inaccurate; though if this was really the case he ought to have stated plainly what the evidence was on which it was allowed to appear in the 'Histoire Naturelle des Mollusques.' Still, the fact remains that it is both described and admirably figured in the latter magnificent publication, and that nothing has yet been placed on record to call in question its claims to be (as it professes) truly Teneriffan. Yet the complete silence of M. d'Orbigny concerning it in his after-list, and the circumstance that it was established professedly on a unique example (said to have been taken beneath dead leaves in the mountains of Teneriffe) are points, so far as they go, to cast

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decided suspicion on the species—whether as regards its Canarian origin or the truthfulness of its diagnosis. Moreover it is not said by whom the species was captured; for, as it was published in 1819, it clearly could not have been by d'Orbigny himself—whose sojourn in the Canarian Archipelago did not take place until 1826."

"The great distinctive feature of this slug—a feature which, if true, would certainly entitle it, as Mousson has well observed, to generic separation—consists in the fact of its being supposed to possess a mucous disk on the hinder edge of its shield, which has the power of emitting a strong phosphorescent light."—Wollaston, *Testacea Atlantica*, 309.

P. NOCTILUCUS, d'Orb. (in Férussac). Pl. 55, fig. 4.

Body thick, broad; hinder part of mantle with a marginal disk formed of part of the mantle, which is lucid green and phosphorescent in the dark; tail rounded; respiratory orifice somewhat anterior. Shell thick, oval, white, nearly transparent, smooth above, crystalline beneath.

*Teneriffe.*

## Genus OOPELTA, Mörch, 1867.

O. NIGROPUNCTATA, Mörch.

Shield with rounded black dots disposed in a double or quincunx order. Length, 1 inch.

*Guinea.*

Unfigured.



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## Family *TEBENNOPHORIDÆ.*

Animal naked, slug-like. Mantle covering the entire back. No mucous pore. No distinct locomotive disk. Jaw oxygnathous. Lingual dentition similar to Helix. No internal shell.

### Genus TEBENNOPHORUS, Binney, 1842.

Animal limaciform, convex, compressed, slightly attenuated behind, obtuse anteriorly; mantle vermiculated, covering the entire dorsal surface of the body, with the pulmonary orifice on the right margin and anterior, close to the head; foot separated from the mantle by a groove. Jaw (Pl. 44, fig. 7) longitudinally striated, with a median projection. Lingual membrane (Pl. 44, fig. 6) long and narrow, central tooth triangular, the lateral cusps obsolete, outer laterals bicuspid, marginals quadrangular, obtusely bicuspid.

*Eastern North America.*

Dr. Gray has described a rudimentary nail-like internal shell, but subsequent authors have not observed any shell.

A number of authors have preferred the generic name *Philomycus*, Rafinesque, 1820, a genus distinguished, like his *Eumelus*, by the absence of a mantle. Like others of Rafinesque's groups, it may have been imaginary—at any rate there is no means of identifying it positively with the present group, and I therefore adopt the oldest name accompanied by a good diagnosis.

#### Section Meghimatium, Van Hasselt, 1824.

(*Incillaria*, Benson, 1842.)

Body convexly depressed, mantle smooth. Other characters as in Tebennophorus. *Asiatic.*

The two groups are better distinguished by their widely separated distribution than by the flatness or convexity of the body. which appears to be the only structural difference. If united, Meghimatium, which has priority, should be retained as a synonym, because it was not sufficiently defined. See "Ueber die Anatomie der Gattungen Incillaria Benson und Meghimatium

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Hasselt in Vergleich mit der von Philomycus Rafinesque," W. Keferstein, *Mal. Blätt.*, xiii, 64.

Subgenus PALLIFERA, Morse, 1864.

Jaw strongly ribbed; other characters same as in Tebennophorus. The character of the jaw would remove Pallifera far from Tebennophorus—with which it is otherwise identical (Pl. 44, figs. 8, 9).

Genus CYSTOPELTA, Tate, 1881.

Body attached for half its length to the back of the foot; mantle very large, enveloping the whole animal in repose, but from beneath which the head and the tip of the tail alone are visible from above, when the animal is crawling; tail with a mucous pore at the tip. No shell. Jaw ribbed, like Arion; dentition resembling Testacella.

C. PETTERDI, Tate. *Tasmania.*

An aberrant form combining the characters of Tebennophoridæ in the ample mantle and absence of the shell-plate, with the dentition of Testacellidæ, and the jaw of Arionidæ.

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Genus TEBENNOPHORUS, Binney, 1842.

T. CAROLINENSIS, Bosc. Pl. 56, fig. 1.

Whitish or yellowish white, with clouds and spots of blackish or brownish, so arranged as to form three ill-defined longitudinal series, anastomosing more or less with each other, and having smaller spots of the same color between them, inferior margin white or yellowish; foot whitish, extending a little beyond the mantle posteriorly, showing a whitish flattened border; surface of mantle covered with irregular vermiform, somewhat longitudinal anastomosing glands, with shallow furrows between, lubricated with a watery mucus, and susceptible of contractions which produce a slow, undulatory motion, like the flowing of water, over the whole surface; locomotive band not distinguished from the lower surface of the foot. Length, 3–4 inches.

*Canada to Florida and Texas.*

Very inactive and sluggish in its motions, inhabiting forests,

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under the bark, and in the interior of decayed trunks of fallen trees; particularly partial to the Basswood (*Tilia Americana*).

This snail is known to deposit about thirty eggs, semitransparent, oval, about ·2 inch long; the young were hatched in twenty days. W. G. Binney enumerates the following color varieties:—

*a.* Whitish, without clouded spots, tending to grayish.
*b.* Whitish, slightly clouded longitudinally.
*c.* Irregularly clouded with brownish, without any tendency to longitudinal arrangement.
*d.* With three distinct rows of large clouded spots.
*e.* With great numbers of fine black spots.
*f.* Gray, with a line of minute black dots along each side.
*g.* Blackish gray, with black lines along each side, and an indistinct line down the middle of the back.

*Limax togata*, Gould, and *L. marmoreus*, Dekay, are synonyms.

T. Crosseanus, Strebel. Pl. 56, fig. 2.

Mantle light-brown, with numerous dark gray flecks or spots; sole with a broad brownish gray central portion, and narrow striated margins. Length, 1·25 inches.

*Mexico.*

T. Sallei, Crosse and Fischer. Pl. 56, fig. 3.

Elongated, a little dilated in front, obtuse posteriorly; color uniform ash-gray without markings, becoming lighter on the sides and sole. Length, 1 inch.

*State of Vera Cruz, Mexico.*

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*Unfigured and Undetermined Species.*

T. auratus, Tate. *Chontales, Nicaragua.*
T. Costaricensis, Mörch. *Costa Rica.*
T. quadrilus, oxyurus, fuscus, flexuolaris, nebulosus, and lividus, Rafinesque. *United States.*
T. lactescens, Blainv. (*Limacella Elfortiana*, Blainv.). *Hab. unknown.*

Placed in this group by Dr. Gray, but evidently does not belong here. The specimens, from long immersion in alcohol, are no longer in condition for specific recognition.

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Section MEGHIMATIUM, Van Hasselt, 1824.

T. BILINEATUS, Benson. Pl. 56, fig. 5.

Slightly granulated, reddish gray, brownish or ash-gray, spotted with black, with a black line on either side, yellowish white on the sole. Length, 2·5 inches.

*China, Japan.*

T. CAMPESTRIS, Godwin-Austen. Pl. 56, fig. 8.

Pale ochraceous, with a longitudinal dark stripe on the side of the body. Length, 1·65 inches.

*Assam.*

I suspect that this is synonymous with the foregoing species.

T. STRIATUS, Hasselt. Pl. 56, fig. 6.

Body elongated, attenuated at each end, pointed behind; back convex, whitish, with a central longitudinal black line and two others on either side—five lines in all. Length, 40 mill.

*Java*, forests in elevated regions.

T. PICTUS, Stoliczka. Pl. 56, fig. 7.

Smooth above, very slightly granular on the sides and tail; bluish gray with three irregular black stripes, the central one broadest, connected by a dotted network; sole livid, transversely striate. Length, 1·5–2 inches.

*Island of Penang.*

Possibly = the preceding species.

T. CYLINDRACEUS, Férussac. Pl. 56, fig. 9.

Smooth, dark brown (in spirits), oblong, ventricose.

*Hab.* ——?

Only known by Férussac's figures.

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T. MONTICOLA, Godwin-Austen. (Unfigured.)

*N. Cachar Hills, Assam.*

T. RETICULATUS (Hasselt), Fér. (Pl. 56, fig. 10.) *Java?*

I have already placed *Parmarion reticulatum*, Hasselt, among the undetermined species of Parmarion in accordance with the opinion of von Martens. Stoliczka remarks that Férussac's figure of the species does not represent a Parmarion but a Meghimatium.

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Subgenus PALLIFERA, Morse, 1864.

T. DORSALIS, Binney. Pl. 56, fig. 4.

Color ashy with a shade of blue, an interrupted black line extending down the centre of the back; tentacles blackish, base of foot white; upper surface covered with elongated and slightly prominent glandular projections, the furrows between indistinct; respiratory orifice very minute. Length, 18 mill.

*Vermont to Pennsylvania, Kentucky.*

Inhabits woods and forests, in the soil under decaying trunks and logs. "It is lubricated by a watery mucus, which is not secreted in quantity sufficient to preserve its life when removed from its native haunts and exposed to the air. It is even difficult to preserve it long enough for examination, as it becomes dry, diminishes more than half in bulk, and dies."—W. G. Binney. It is active in its movements.

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*Unfigured Species.*

T. WETHERBYI, W. G. Binney. Resembles the young of *T. Carolinensis*, but the color blotches are usually in transverse instead of longitudinal series; it is also more swollen anteriorily and tapers more rapidly posteriorly. The jaw is ribbed as in Pallifera. Length (contracted in alcohol), 12 mill. *Whitley Co., Kentucky.*

T. AUSTRALIS, Bergh. *Oahu, Sandwich Islands.*

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## Family *ARIONIDÆ*.

Animal with or without mucous pore; mantle anterior, concealing a shell-plate, or a few calcareous grains which represent it; jaw strongly ribbed, central tooth tricuspidate, the median cusp long and narrow, laterals and marginals bicuspidate.

### *Synopsis of Genera.*

### * *With caudal mucous pore.*

### Genus ARION, Férussac, 1819.

Animal naked, limaciform, subcylindrical, attenuated but not carinated behind, rugose, with a caudal mucous pore; shield granular, small, anterior, covering calcareous grains which are sometimes agglomerated into the semblance of a shelly plate; locomotive disk distinct; pulmonary orifice at the right anterior margin of the shield, the genital orifice under it. Jaw (Pl. 44, fig. 11) arcuated, strongly ribbed; central tooth tricuspid, the central cusp long and narrow, laterals bicuspid, marginals bicuspid, the inner cusp long and narrow (Pl. 44, fig. 10).

The species inhabit Europe and the north of Asia and Africa. The "land soles" occasionally devour animal substances, such as dead worms or injured individuals of their own species. They lay 75–100 eggs between May and September, which are 26–40 days in hatching, and the snail attains its full growth in a year, beginning to oviposit a month or two before that period. The eggs of *A. hortensis* are very phosphorescent for the first fifteen days.

Section Lochea, Moquin-Tandon, 1855. Internal shell represented by isolated calcareous granules. *A. rufus*, Linn.

Section Carinella, Mabille, 1870. Dorsally somewhat carinate. *A. Dupuyanus*, Bourg.

Section Prolepis, Moquin-Tandon, 1855. Calcareous granules agglomerated into an imperfect shell-plate. *A. fuscus*, Müll. *Kobeltia*, Seibert, is a synonym.

Section Baudonia, Mabille, 1868. Body anteriorly enlarged and depressed, the shield almost smooth, the head well separated from the body, tentacles rather small. Two Portuguese species.

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Section ARIUNCULUS, Lessona, 1881. Genital orifice anterior to the pulmonary orifice. *A. Isseli*, Bourg.

### Genus GEOMALACUS, Allman, 1843.

Animal limaciform, subcylindrical, blunt behind, with a but little developed mucous pore; mantle anterior, close to the head, concealing a shell-plate; a distinct locomotive disk; respiratory orifice on the right anterior margin of the mantle; genital orifice behind and below the right eye-peduncle. Shell-plate calcareous, ovate, small and solid. Jaw costulated; lingual dentition as in Arion (Pl. 45, figs. 14, 15).

*G. maculosus*, Allman. *Western Europe.*

### Subgenus LETOURNEUXIA, Bourguignat, 1866.

? No caudal mucous pore. There is a peculiar overhanging process to the side of the body, near the tail.

*G. Numidicus*, Bourg. *Algiers.*

### Genus ARIOLIMAX, Mörch, 1860.

Animal limaciform, subcylindrical, tapering behind; mantle anterior, small, concealing an internal shell-plate; caudal mucous pore triangular, elevated; locomotive disk distinct; respiratory orifice on the posterior right margin of the mantle; orifice of combined genital system below the right anterior free edge of the mantle. Shell-plate solid, flat, longer than wide.

Jaw ribbed. Lingual membrane with tricuspid centrals, bicuspid laterals and quadrate marginals (Pl. 45, figs. 12, 13).

*A. Columbianus*, Gould. *Pacific States of North America.*

### Genus HEMPHILLIA, Bland and Binney, 1872.

Animal limaciform, blunt before, swollen at centre and attenuated behind; mantle subcentral, large, oval, greatly produced in front, free around its margin, and slightly covering the edge of the shell-plate; a caudal mucous pore, over which is a hump-like process; no distinct locomotive disk; respiratory orifice on the central right margin of mantle; genital orifice near the right eye-peduncle. Shell mostly exposed, unguiform, subquadrangular, the margins covered by the mantle.

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Jaw and dention as in Arion (Pl. 45, figs. 17, 18).

One species, *H. glandulosa*, B. and Bl. *Oregon.*

Differs at first sight from all the preceding genera in its exposed shell.

** *No mucous pore.*

Genus ANADENUS, Heynemann, 1863.

Limaciform, subcylindrical, tapering behind, mantle large, granular, anterior, concealing a shell-plate; no mucous pore; locomotive disk distinct; respiratory orifice median or posterior; genital orifice behind and below the right eye-peduncle. Shell-plate small, oval, flat, nucleus medio-posterior.

Jaw costulated; dentition as in Arion (Pl. 45, fig. 16).

*A. giganteus*, Heynemann. *Himalaya Mountains.*

Genus PROPHYSAON, Binney and Bland, 1873.

Without distinct locomotive disk; respiratory orifice a little anterior on the right margin of the mantle; otherwise like Anadenus. Shell-plate subhexagonal.

*P. Hemphilli*, Binn. and Bl. *Pacific Region of U. S.*

Dr. Fischer makes this a subgenus of Anadenus. Dentition and jaw (Pl. 45, figs. 23, 24).

Genus CRYPTOSTRACON, W. G. Binney, 1879.

Animal limaciform, subcylindrical, attenuated behind; mantle slightly anterior, thin, small, concealing the shell; no mucous pore; respiratory orifice on the middle of the right margin of the mantle. Shell internal, sigaretiform, rudimentary, large as the mantle, membranous, subspiral, with postero-lateral nucleus.

Jaw and dentition as in Arion (Pl. 45, figs. 19, 20).

One species, *C. Gabbi*, Binney. *Costa Rica.*

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Genus ARION, Fér., 1819.

Section LOCHEA, Moquin-Tandon, 1855.

A. RUFUS, Linn. Pl. 56, figs. 11–15; Pl. 57, figs. 16, 17, 22.

Robust, large, strongly rugose, somewhat rounded at either extremity, not carinated; unicolored or striped, not maculated; shield oval, granular, not gibbose; pulmonary orifice anterior,

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rounded; sole wide, with dark marginal zones, margin of the foot transversely sulcate, and lineated with brown; color typically reddish brown, the head blackish. Length, 4–5 inches.

*Europe*, *Algiers*, *Iceland*, *Azores*, *Madeira*.

This large and common slug has received many names, being quite variable in coloration. It is *A. empiricorum*, Fér. (figs. 11–13), in part; *A. melanocephalus*, Faure-Biguet (juvenile); *A. Servainianus*, Mabille (perhaps a variety—unfigured).

"The Arions, or black slugs, frequent damp and shady woods, as well as hedge-banks and gardens. During the daytime they lurk under stones and logs of wood, or bury themselves in the earth, where they excavate a sort of tunnel; but at night, and after rain, they sally forth to feed. They are great pests in gardens, generally selecting the best cabbages and most succulent vegetables. They are, however, not very particular about their food, and act the part of land-scavengers, devouring animal matter of all kinds in every state of decomposition, and even each other's slime. They may be frequently met with in garden-walks, after a shower, in search of food. During the season of reproduction they deposit their eggs, which are very numerous, separately underground. When at rest, they contract their bodies into a lump. In this state they offer a dainty prize to ducks."—Jeffreys, *Brit. Conch.*, i, 126.

Var. ALBUS, Linn. (fig. 14). Whitish, shield yellowish white, margin of foot yellow or orange-colored.

Var. SUCCINEUS, Müll. Amber-colored. *A. luteus*, Razoum., is a synonym.

Var. ATER, Linn. (figs. 15, 17). Black or chocolate-color, margin of foot sometimes orange-color or scarlet. *A. marginellus*, Schrank, is a synonym. The subvarieties include *Mülleri*, *marginatus*, *Draparnaudi* and *bicolor* of Moquin-Tandon; *cinereus*, Westerlund; *medius and cinereo-nebulosus*, Jensen, etc.

Many European malacologists consider var. *ater* a distinct species; its form is said to be more elongated and less obese, its rugosities very long and elevated, preserved when in alcohol, whilst in *A. rufus* they fade out in alcohol. It is, in France, a mountain variety, rarely encountered in low-lying regions.

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Var. CAMPESTRIS, Mabille. A small form, with long dorsal rugosities, which are somewhat sharp; the oval-elongated shield covers the neck; orange-colored, border of the foot yellowish with numerous orange dots. *France.*

Var. HIBERNUS, Mabille. Body posteriorly attenuated, with slight rugosities, shield oval, rounded at the extremities, almost covering the neck; dark purple or rust-color, the foot white, its margins with brownish transverse lines. *France.*

Var. GAUDFROYI, Mabille. Size moderate, the rugosities rather sharp, somewhat tuberculated on the shield; reddish gray or yellowish, foot yellowish gray, the median band translucent, the margin grayish, with transverse short black lines. *France.* *A. succineus*, Bouillet, is a synonym.

Var. BICOLOR, Broeck. (fig. 16). Black, longitudinally striped with yellowish white. Length, 30 mill. *Luxembourg.* It may be a juvenile.

Var. RUPICOLA, Mabille. Small, greenish or reddish, with blackish lateral bands, foot whitish, slightly blue in the middle, the margins yellowish or whitish, with some lines and numerous dots of yellow; shield covering the neck, encircled by a black band. *France.*

A. FUSCUS, Müller. Pl. 57, figs. 18–21.

Robust, strongly rugose, rounded behind; shield posteriorly truncate, coarsely granular; pulmonary orifice a little anterior, large; margin of foot yellowish or grayish, transversely lineated with brown; brown or orange-color, middle of back and shield reddish brown, the sides of either bearing a reddish-brown zone.

Length, 3 inches.

*Europe*, *Iceland*, *Greenland*, *New Zealand* (introduced).

The synonymy includes *A. subfuscus*, Drap.; *A. cinctus*, Dumont; *A. fasciatus*, Nilsson, in part; *A. incommodus*, Hutton.

The varieties include the Norwegian *quadrifasciatus* and *medius* of Jensen, and the following:

Var. BOTTGERI, Pollonera (fig. 19). Back flecked or punctate with black. *Bremen.* Var. *atripunctatus*, Dum. et Mortillet, appears to be somewhat similar. *Savoy.*

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Var. MABILLIANUS, Bourg. (fig. 21). Elongated, attenuated behind; ochraceous with three darker bands; dorsal rugosities strong, elongated, separated by shallow sulci; margin of foot grayish white with perpendicular brownish lines. *France.*

A. BRUNNEUS, Lehmann. Pl. 57, fig. 26.

Rugose, rugæ long, narrow, not very prominent; shield oblong, rounded at the extremities, granular; pulmonary opening small, anterior; eye-peduncles granose; rust-colored or coffee-brown, the back, middle of shield and tentacles darker, blackish, the sides lighter, reddish brown; border of foot yellowish with fine black perpendicular lines; sole yellowish white.

Length, 2 inches.

*Stettin, Pomerania; Karlsbad, Bohemia.*

A. SULCATUS, Morelet. Pl. 57, fig. 23.

Rugæ very large and strong, vermicularly sculptured, shield granular, with a large anterior pulmonary opening; uniform blackish or brownish black, sometimes bluish on the shield, margin of the foot chestnut, rayed; mucus yellowish white.

The shell grains small and numerous, much more minute than in *A. rufus*, var. *ater*. Length, 6 inches.

*Portugal.*

Section CARINELLA, Mabille, 1870.

A. DUPUYANUS, Bourg. Pl. 58, fig. 31; Pl. 57, fig. 27.

Wide, dorsally more or less carinate, dorsal rugæ thin, elongate; whitish gray, darker above, and with indistinct lateral zones; shield granose, rounded at the ends, grayish black; foot margined with obscure lineations, the sole whitish.

Length, 40 mill.

*France.*

The juvenile has been described under the above name by Bourguignat. It was 10 mill. long, and bluish, the carina stronger and whitish, the darker longitudinal zones very faint. Mabille subsequently described the adult as *A. Bourguignati*.

*A. Neustriacus*, Mabille (unfigured), is a carinate species said to be distinguished from *A. Dupuyanus* by its reddish gray color, its stronger, elongated, regular dorsal rugæ, and the absence of the marginal lineoles. *France.*

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According to Mabille the Swedish *A. fasciatus*, Nilsson, is a closely related species, showing its dorsal carina plainly when contracted.

*Geomalacus Bayani*, Jousseaume (fig. 27), is a juvenile of this species.

Section PROLEPIS, Moquin-Tandon, 1855.

A. HORTENSIS, Fér. Pl. 57, figs. 28–30; Pl. 58, figs. 32–34.

Small, elongated, rugose, the rugæ elongately rounded, shield rather small, finely granulated; ash or yellowish, darker on the back and middle of the shield, with a darker zone on either side; tentacles blackish; margin of foot not usually lineolated.

Length, 35–50 mill.

*Europe; Boston, U. S.* (introduced).

The shell-plate is rudimentary or sometimes somewhat developed.

The synonyms include *A. concavus*, Brard; *A. leucophæus*, Normand; *A. subfuscus*, Picard; *A. lineolatus*, Risso; *A. circumscriptus*, Johnston; *A. variegatus*, Turton; *A. fuscus* of American authors (fig. 32).

The varieties include:

Var. FASCIATUS, Moquin-Tandon. Grayish ash, fasciated, whitish on the sides, sole and margin of foot yellowish.

Var. ALPICOLA, Moquin-Tandon. Grayish yellow, the shield yellowish, shield and back distinctly fasciated with brown or black, sole and margin of foot orange-yellow.

Var. AUREUS, Lessona. Whitish, yellowish on the back, shield, tail, sole and margin of the foot orange-yellow, dorsal and shield zones obsolete.

Var. FUSCATUS, Fér. (fig. 34). Pale brown, the dorsal rugæ feeble, elongated, but slightly apparent, separated by grayish sulcations.

Var. PELOPHILUS, Mabille. Blackish, with very dark zones, margin of foot bright red.

Var. ANTHRACIUS, Bourg. (fig. 30). Black, with metallic reflections; sole whitish.

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Var. PASCALIANUS, Mabille. Black, sides and margin of the foot bluish passing into gray; rugæ and sillons very slight. *Portugal.* It is *A. fuscatus*, Morelet.

Var. DISTINCTUS, Mabille. Smaller than the type, grayish yellow, dorsal rugæ not elongated, margin of the foot not lineolated. *France.*

A. VERRUCOSUS, Breviere. Pl. 58, fig. 35.

Brownish, or grayish violet, darker above, very minutely inconspicuously maculated; shield verrucosely granulate, with a posterior dark-colored depression, and often with lateral dark bands; rugæ of the body with glandular elevations, regularly spaced; sole whitish or yellowish; shell a membrane, thin, transparent, to which adhere a few grains of lime.

Length, 20–25 mill. *France.*

The granules of the shield are constantly wet, the rugæ of the body are apt to take the form at times of interrupted longitudinal ridges, the dark-colored depression of the posterior portion of the shield also appears to be a peculiar feature.

A. TENELLUS, Millet. Pl. 58, fig. 36.

Glaucous green, becoming yellowish green on the margin of the foot, head and tentacles blackish; rugæ elongate, not prominent, the sulci shallow; mantle large, granular, rounded at the extremities; foot soiled greenish white. Length, 50–55 mill.

*Northern and Middle France.*

*A. virescens*, Millet (not Fér.), is a synonym. This is not *Limax tenellus* of Müller—which is a true Limax.

A. FULIGINEUS, Morelet. Pl. 18, fig. 37.

Dark chestnut-colored, with a narrow radiated orange or ruby margin; sole yellowish; mantle granose, gibbous.

Length, 2·25 inches. *Portugal.*

This species has not been determined since the original description.

Section BAUDONIA, Mabille, 1868.

A. TIMIDUS, Morelet. Pl. 58, figs. 38, 39.

Grayish brown, darker on the back, shield, head and tentacles;

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margin yellowish, bipartite by a brown line and with brown transverse lineoles, sole iron-color with a livid zone.

*Portugal.*

Var. MONTANUS, Mabille. Fig. 39.

Greenish brown, the margin iron-color, with the brown dividing line, and transverse lineoles, sole iron-color.

Section ARIUNCULUS, Lessona, 1881.

A. ISSELI, Bourg. Pl. 58, fig. 40.

Rugose, olivaceous black; the shield blackish, minutely granulose; mucous pore small; margin of foot olivaceous, transversely sulcate, but not lineolated; sole with olivaceous lateral zones, the median whitish. Length (in alcohol), 35–40 mill. No shell-plate.

*Island of Sardinia.*

A. SPEZIÆ, Lessona. Pl. 59, fig. 48.

Small, cylindrical, rounded behind, very slightly rugose; shield rather small, gibbose, smooth; orange-brown, the shield unicolored, the back with a dark stripe on either side; sole pallid, margin of foot not lineolated; head blackish. Shell represented by a collection of small white calcareous granules.

Length (in alcohol), 20 mill.

*Piedmont.*

A. MORTILLETI, Lessona. Pl. 58, fig. 41.

Rugose, rugæ wide, depressed; shield moderate, not gibbose, granulose, unicolored; margin of foot not transversely lineolated. Length (in alcohol), 20–25 mill.

*Alps of Piedmont.*

The typical form is light yellowish brown, the neck and sides lighter; the tentacles and posterior margin of the foot blackish. *A. flavus*, Lessona, is a synonym.

Var. AURANTIACUS, Lessona. Back and shield orange-color, with a darker zone on either side; tentacles black.

Var. MONACHUS, Lessona. Brownish yellow, the tentacles, sides and margin blackish.

Var. PULLATUS, Lessona (var. figured). Blackish, lighter on the sides and in front of the shield.

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A. CAMERANI, Lessona. Pl. 58, fig. 42.

Larger than the preceding species, subrugose; shield moderate, not gibbose, very finely granulose; back yellowish, with a nebulose blackish zone on either flank; margin yellowish white, transversely irregularly lineolate with brown; tentacles black.

Length (in alcohol), 25 mill.

*Piedmont.*

A. MORELETI, Hesse. Pl. 57, figs. 24, 25.

Yellowish horn, with a dusky irregular band on either side the middle, and a lateral one on the sides; shield flatly rounded behind; sole unicolored. Internal shell-plate small, solid, irregular in form. Length, 40 mill.

*Tangiers.*

Allied to *A. fuscus*, but distinguished by the position of the genital opening, anteriorly on the neck near the right tentacle.

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*Unidentified or Unfigured Species of Arion.*

A. FOLIOLATUS, Gould. Pl. 58, fig. 43.

Color reddish fawn, coarsely obliquely reticulated with slate-colored lines forming areolæ; mantle concentrically mottled with slate-color, border of foot obliquely lineated; mantle very long, smooth, the small respiratory orifice a little in front of the middle of the right margin; eye-peduncles small and short.

Length, 85 mill.

*Discovery Harbor, Puget Sound.*

Still unknown, except by the original figure and description, published over thirty years ago.

A. FALLAX, Sterki. *Switzerland.*
A. AUSTENIANUS, Nevill (undescribed). *Mentone.*
A. SOURBIENI, Fagot. *France.*
A. ORESICŒCUS, A. PALADILHIANUS, Mabille. *France.*
A. MABILLEI, Baudon. *France.*

Described as a Geomalacus, but subsequently ascertained to be a young Arion. The specific name has been preoccupied in Arion by Bourguignat.

A. AGGERICOLA, Mabille. *France.*
A. LUSITANICUS, Mabille (*A. rufus*, pars, Morelet). *Portugal.*
A. RUBIGINOSUS, Baudon. *France.*

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|---|---|
| A. NIVALIS, Koch. | *Tyrol.* |
| A. OLIVACEUS, Schmidt. | *Transylvania.* |
| A. PEGORARII, Lessona and Pollonera. | *Aosta, Italy.* |
| A. LIMACOPUS, A. CITRINUS, Westerlund. | *Sweden.* |
| A. POLLONERÆ, Pini. | *Italy.* |
| A. ATERRIMUS, Gray. | *So. Africa.* |

## Genus GEOMALACUS, Allman.

Dr. D. F. Heynemann thus remarks upon the supposed French species of Geomalacus :—

Through Mr. T. A. Verkrüzen of London, I received a small parcel of living *Geomalacus maculosus*, Allman, from Ireland; and having carefully examined these, I am now enabled critically to investigate the statement of several French authors that this genus not only occurs in France, but is there represented by various species.

English authors started an hypothesis that the animals, with the plants they live amongst (and which are only met with in the southwest of Ireland), were of Asturian or Spanish origin.

Although it had not been proved that Geomalacus does occur on the Pyrenean peninsula until Lucas von Heyden found one specimen in the Asturias, during his entomological journey in Spain in 1868, and forwarded it to Germany, the above hypothesis of British authors was nevertheless adopted in 1867, by the French malacologists Bourguignat and Mabille; and they even went to the length of taking as an established fact what has been proposed as a supposition only.

Geomalacus having thus been once established as of Spanish origin, its distribution must, according to the ideas of these authors, have taken place by the way of France only. All at once they discovered consequently in the forest of Meudon, near Paris, what they wished to find, not only the traces of the migratory Geomalacus, but even three new or entirely unknown species, which were described by Mabille in his monograph of this genus, published in the "Revue et Magasin de Zoologie," 1867, p. 53, as *Geomalacus Bourguignati*, *Paladilhianus* and *Moitesserianus*. From that time new species continued ever increasing, the names of which may as well be passed over in



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silence; and this fabrication attained an alarming extent in France. The statements were at first so positively made by our French contemporaries, that even the incredulous (including myself) almost believed in the existence of this genus in France; but those who with any attention read my short treatise in the "Nachrichtsblatt der deutschen Malakozoologischen Gesellschaft," 1869, p. 165, entitled "Zur Kenntniss von Geomalacus," will readily see what serious doubts I entertained upon the subject. Our French neighbors did not favor us with any drawings of their new species, although they describe the English drawings as "déplorables."

I had myself never before seen a live Geomalacus; neither could I obtain any French specimens, in spite of the pains I took for this purpose. It will, therefore, I trust be deemed excusable that I expressed doubts where I could not contradict by facts. But now since I have received the living Geomalacus, and have had an opportunity of examining the animal, the question assumes a different aspect.

The French so-called species do not belong at all to Geomalacus; and those who may still entertain a doubt on this point need but inspect the drawings, which have since appeared in Baudon's "Mémoire sur les Limaciens du département de l'Oire' (Beauvais, 1871), of *Geomalacus Mabilli*, Baudon, and *G. hiemalis*, Drouet. These drawings are excellent; and for this very reason we at once detect in them our old acquaintance *Arion melanocephalus*, Faure-Biguet, which likewise has lately been recognized as our common *Arion empiricorum*, Fér., in its younger state of growth by Seibert (see "Nachrichtsblatt der deut. Mal. Ges." December, 1872).

These drawings of Baudon are alone sufficient entirely and effectually to upset at once the famous myth of a French Geomalacus. This genus has not as yet been discovered in France, and all the species described as French are in all probability not different from *Arion empiricorum*. I very much question whether the French authors have ever seen a living Geomalacus; and for their own justification I would deny the fact, because they could never otherwise have entertained the idea of turning a young Arion into a Geomalacus, although it is no wonder that, when once an erroneous generic designation had

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been given to a young Arion, the number of the species could be most readily increased.

The substitution has doubtless been no easy task for Mabille in the composition of his monograph; but he must have formed for himself a totally different conception of the animal, which had hitherto been described by English authors only, though with sufficient distinctness. In his generic diagnosis, Mabille states that the animal is ornamented with an infinite number ("d'une infinité") of minute black, yellow, golden, white or silvery dots, which, by the by, is by no means correct; and in his improved specific diagnosis he even amends the original English descriptions in so cool a manner that I am astonished that English malacologists should not have replied to it. Mabille says in the same diagnosis, that the English draftsmen, instead of covering the body of this slug with a multitude of white dots, had contracted the same upon the wrinkles, and to facilitate their labor, had united them into one single spot on the different wrinkles. And this, he states to be the reason why the Geomalacus appears to be a black animal with longitudinal white ridges or hillocks, and which, he says, is quite incorrect. This statement of itself suffices to convince us that Mabille has never seen a living Geomalacus; for what he supposes to be altogether incorrect is precisely the actual fact. The Geomalacus is not covered with white or yellow dots, but with actual longitudinal spots extending on the back of the animal over one or two of the wrinkles. These spots are even distributed on a black ground in such a manner that they might easily be counted; and the drawings of Allman are quite correct.

Mabille's description of the respiratory orifice as being considerably in front ("très anterieur"), corresponds admirably with that of a young Arion. The original diagnosis says, "a Limace (differt) situ anteriori spiraculi;" for in the Limax the respiratory orifice is situated behind the middle of the mantle, and not in front of it. Further incorrect is Mabille's statement respecting the internal shell—namely "Limacelle délicate, excessivement plate;" and, further, "Sa Limacelle mince comme une pellicule." The original diagnosis says "Testa solida;" and, indeed, its thickness attains almost a third of its length, and nearly the half of its breadth. The shell is consequently by no

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means "délicate," and much less "mince or plate," but actually very solid—in fact, as solid as we rarely meet with internal shells, to whatever genus they may belong. It only remains for me to add a few words, in order to dispose of the remainder of Mabille's species, created only to swell the above-mentioned monograph. These are designated: *Geomalacus Andrewsi*, Mabille; *G. anguiformis*, Morelet, and *G. intermedius*, Normand. Allman, Andrews and others, repeatedly name a white-spotted variety, the same which in my treatise, "Ueber Geomalacus" (Malacozool. Blätter, 1873), with drawings, I called var. *Allmanni*, in contradistinction to the more frequently occurring yellow-spotted variety, which is the typical form. Andrews calls the white-spotted form simply, "the white variety;" and on this white-variety (it should be white-spotted variety) Mabille writes as follows: "Cette nouvelle espèce, que nous dédions à Monsieur William Andrews de Dublin, et que tous les auteurs Anglais ont confondus avec le *maculosus*, se distingue de cette espèce par un corps blanchâtre parsemé d'une multitude de petits points noirâtres. C'est l'inverse chez l'espèce précédente (*maculosus*)." He evidently misconstrues the original meaning; and the result is the new species *Andrewsi*. Jeffreys, in his "British Conchology," says, "I suspect that the *Limax anguiformis* of Morelet (Moll. Port.) also belongs to the present genus, if, indeed, it is not the same species as ours." This simple notice suffices to settle the *Geomalacus anguiformis*, Morelet, whose specific diagnosis is anything but improved by the all but useless drawing of Morelet. Finally, Normand ascribes to his *Arion intermedius* an internal shell; and thus we obtain a *Geomalacus intermedius*, Normand.

It is to be regretted that the rubbish of synonymy is thus needlessly multiplied to an extraordinary degree by such ingenuity in creating new species and even new genera.—*The Annals and Magazine of Nat. History*, vol. xi, fourth series, page 271. London, 1873.

G. MACULOSUS, Allman. Pl. 59, figs. 49, 50.

Shield and upper portion of body black, elegantly spotted with yellow, often forming more or less interrupted stripes on the back; margin of foot brown, with transverse sulci; loco-

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motive disk light yellow, divided into three nearly equal longitudinal bands. Length, 2 inches.

*West Ireland* (introduced from *Spain*?), *Spain.*

A rare mollusk, apparently of very local distribution. It can elongate itself so as to assume the appearance of a worm, and thus enter exceedingly small apertures.

Var. ANDREWSI, Mabille. Black or very dark brown, with white spots. Var. *Allmani*, Heynemann, is a synonym.

Var. VERKRUZENI, Heynemann. The black coloring shading into gray, darker on the back, maculations white.

G. ANGUIFORMIS, Morelet. Pl. 58, fig. 44.

Greenish brown, with a dark band on either side; rugæ thin, reticulated; mantle elongate, smooth, minutely black-dotted; head and tentacles bluish; respiratory cavity anterior.

Length, 2·5 inches.

*Portugal.*

A somewhat doubtful species. Although the figure and description indicate different coloration, its identity with *G. maculosus* has been surmised.

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*Unfigured and Spurious Species.*

G. LUSITANICUS, Silva. *Portugal.*
G. VENDEIANUS, Letourneux (? = *Arion*, juv.). *France.*
G. INTERMEDIUS, Normand (*Arion flavus*, Fér.) = *Arion*, juv. *France.*
G. BOURGUIGNATI, Mabille (G. HIEMALIS, Baudon) = *Arion*, juv. *France.*
G. PALADILHIANUS, and G. MOITESSIERIANUS, Mabille = *Arion*, juv. *France.*
G. MABILLEI, Baudon. = *Arion*, juv. *France.*

Subgenus LETOURNEUXIA, Bourg., 1866.

The supposed absence of the mucous pore, one of the principal points of distinction from Geomalacus, is probably an erroneous observation made upon individuals contracted in alcohol. Fischer and others have united this group with Geomalacus as a synonym.

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G. Numidicus, Bourg. Pl. 58, figs. 45, 47.

Nearly smooth, the rugæ barely perceptible; shield and back more or less blackish, sides yellowish with a black band; foot obscure, yellowish, with a more obscure median zone; mantle oblong, rounded at either extremity, minutely granular.

Length, 60 mill.

*Northern Africa, Gibraltar.*

## Genus ARIOLIMAX, Mörch, 1860.

A. Columbianus, Gould. Pl. 59, figs. 51, 52.

Dark, dirty greenish yellow, sometimes clouded with large purplish black irregular blotches; body large and corpulent, anterior portion elevated, back rounded, posteriorly strongly carinated, with a caudal mucous pore; foot-margin ruffled, with transversely oblique markings; surface longitudinally coarsely rugose. Length, 6 inches.

Shell-plate oblong, large.

*Pacific Region of the United States.*

Abounds in dense damp forests near the coast. It is found every month of the year in Washington Territory, being even more abundant in the rainy winter than in warmer seasons; its activity being checked only by extreme cold, while it cannot bear continued drought. It not unfrequently drops from trees, etc. Dr. Cooper remarks that when alive it is smooth, not rugose as described and figured. Prof. Wetherby has named, but not described a var. *Hecoxi.*

A. Californicus, Cooper Pl. 59, figs. 53, 54.

Resembling *A. Columbianus* in form or color, but with the dorsal grooves much more numerous (26–36), often twice as many, and the connecting reticulations transverse. The dorsal grooves are colored like the rugæ, but the grooves of the upper margin of the foot are colored brown, sometimes very pale, and the stripes wider at every fourth or fifth, like the grooves; longitudinal division of the sole very faintly perceptible. Shell-plate differing in form from *A. Columbianus.*

Near *San Francisco*, and in the *Sierra Nevada, Cal.*

The external difference from *A. Columbianus* is very slight; but the shell-plate and the genitalia give distinctive characters;

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nevertheless it may prove to be a variety only of that species. Dr. Cooper says that the young, just hatched, is pale yellowish, with pellucid whitish spots, and when an inch-and-a-half long is colored like the adult, while the shell is perceptible through the thin shield. The eggs are laid from April to June; "they have a shelly but tough envelope, and, after they are laid, the shell is *often entirely wanting* in the parent, having apparently been absorbed to form the egg-shells."

A. NIGER, Cooper. Pl. 59, figs. 55, 56.

Body long and narrow, blunt before, but little attenuated and bluntly truncated behind, but with the termination of the body not arched down to the tail as in *Columbianus* and *Californicus*, but rather erect, giving the appearance of being cleft, and showing much more plainly the caudal gland; mantle quite small, bluntly rounded before and behind; color leaden below, blackish above. Length, 2·5 inches. *California.*

Distinguished by smaller size, dark color and bluntly truncated posterior termination, which is decidedly cleft at the mucous pore. The genitalia also present distinguishing features from the preceding forms.

A. HEMPHILLI, W. G. Binney. Pl. 59, fig. 57.

From 25 to 31 mill. long, of a transparent flesh-color, much more slender than the other known species, with a much more pointed tail; the mantle is also longer.

*Niles Station, Alameda Co., Cal.*

"These characters, even in specimens preserved in alcohol, readily distinguish the species. On dissecting the specimens, I also found distinguishing characters in the genitalia."—BINNEY.

A. ANDERSONI, Cooper. Pl. 59, figs. 58–60.

Shield strongly granular-rugose, the respiratory orifice nearly median on its right margin; tail acute, with small gland; reddish gray, the body somewhat clouded with black, the shield paler, clouded, or more usually with a dark band on each side above the respiratory orifice, converging in an elliptic form; a pale dorsal streak; head uniform pale brown, tentacles darker; foot and often the mantle tinged with olive. Length, 2·5 inches.

*California.*

This species is said to have the appearance of the figure of

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*Arion foliolatus*, Gould, but is much smaller. It differs from Prophysaon in having a mucous pore, yet is otherwise so closely related in its general features to *P. Hemphilli*, that it is doubtful whether they will not need to be united. Dr. Cooper writes of Prophysaon: "The authors remark that they had only compared alcoholic specimens with my description and figure of *Arion Andersoni*. I have compared *their* description and figure with alcoholic specimens of my species, and find that the differences mentioned by them are caused chiefly by the contraction by the alcohol. The distinct locomotive disk, minute caudal pore and position of the generative orifice, all become changed as described by them. The jaw figured by them differs only in being immature, and in some of the ridges being consolidated, thus showing eight single and six double ones, making twenty, as given by me. This difference, with other possible distinctions in color in fresh specimens may be sufficient to separate their species. Mine is, however, of the same genus."

According to this, Prophysaon would need to be united with Ariolimax; yet Mr. Binney (Terr. Moll., v. 235) maintains Prophysaon, and whilst admitting that specimens received from Dr. Cooper as *A. Andersoni*, really belong to Prophysaon (but distinct from *P. Hemphilli*), he describes and figures an *Ariolimax Andersoni*, Cooper (fig. 58), which he says, if really generically different from Dr. Cooper's species, may take the name of *A. Andersoni*, W. G. Binney.

## Genus HEMPHILLIA, Bland and Binney, 1872.

H. GLANDULOSA, Bl. and Binn. Pl. 45, figs. 27, 28.

Animal from 12 to 30 mill. long (preserved in alcohol); smoky white, mottled with longitudinal dark-brown blotches, running obliquely from the edge of the mantle to the foot, uniformly with the coarse granulations, of which there are about twenty-five on either side of the animal. Caudal process very large, triangular in profile, dark brown, with a few coarse granulations.

Shell unguiform, slightly convex, light horn-color, very thin, its edges almost membranous, with prominent concentric lines of growth.

Length 5 mill., width 3 mill., in an animal of 12 mill. length.

*Astoria, Oregon.*

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## Genus CRYPTOSTRACON, W. G. Binney, 1879.

C. GABBI, W. G. Binney. Pl. 45, figs. 26, 21, 22.

Animal varying from black to shades of brown, and variously mottled with black or dark brown; usually a little greenish over the shell, darkest posteriorly. Length, 3·25 inches.

Internal shell rudimentary with concentric growth-lines; very membranous; about two whorls are indicated. Length, 14 mill.

*Flanks of Pico Blanco, Costa Rica,*
elev. 5000 to 7000 feet.

## Genus PROPHYSAON, Bland and Binney, 1873.

P. HEMPHILLI, Bland and Binney. Pl. 45, figs. 29, 30.

Mantle granulated, whitish, with a circular ring of smoke-color above the respiratory orifice; body obliquely reticulated with bluish lines, the reticulations larger (about twelve) below each side of the mantle, more numerous and smaller on the posterior extremity of the body; these reticulations are subdivided by irregularly disposed, rounded tuberosities, with colorless interstices. Above the foot, from the longitudinal line running around the animal to the edge of the foot, are perpendicular lines or furrows, also bluish in color. The sole has crowded wrinkles running obliquely backwards from its centre to its margins. Length of an alcoholic specimen, 40 mill.

The internal shell differs in thickness, but is always well-marked, sometimes suboval, sometimes subhexagonal, always longer than wide.

Differs from Ariolimax in having no mucous pore, but on this subject see remarks under *A. Andersoni*, p. 247. The latter, as described by Dr. Cooper, may belong to this species, or is closely related to it.

## Genus ANADENUS, Heynemann, 1863.

A. ALTIVAGUS, Theobald. Pl. 59, figs. 62, 63.

Shell slightly granular, back rugosely reticulated; color greenish brown or yellowish brown; head and tentacles blackish.

Length, 6 to 9 inches.

Shell internal, thin or flat, sometimes very thick. 20 mill. long, 12 mill. wide. *Sikkim, Himalayas*, 6000 to 9000 feet.

It is *A. giganteus*, Heynemann.

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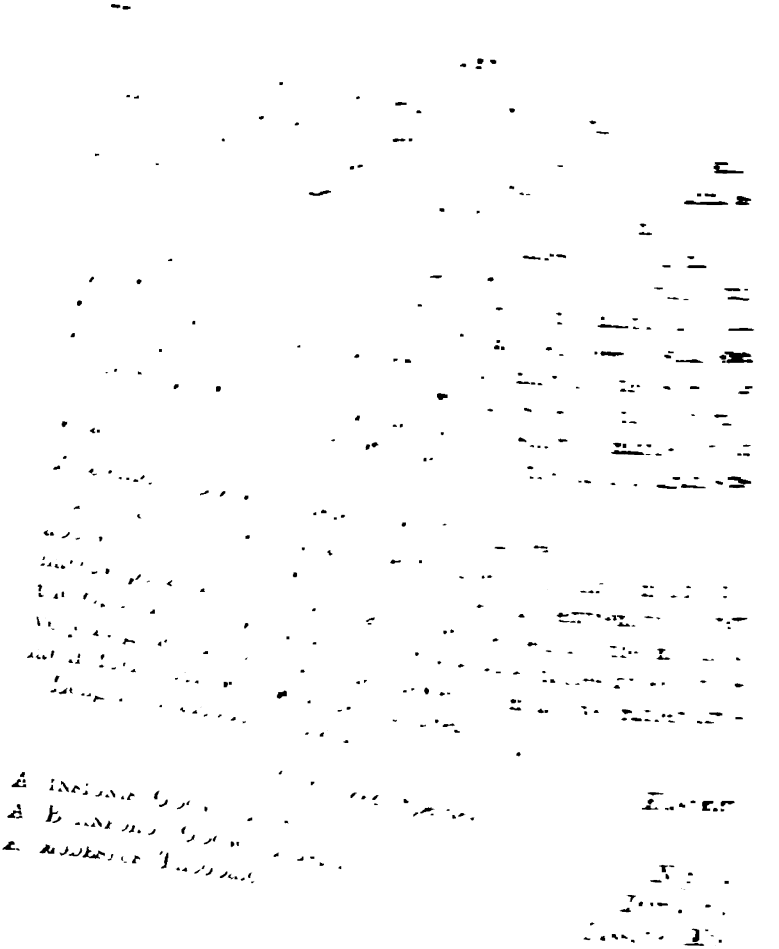

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## APPENDIX.

CHLAMYDEPHORUS GIBBONSI, W. G. Binney, p. 17.

Heynemann has examined a second specimen, in alcohol, from Cape Colony, preserved in the British Museum. He states that the description of a mantle covering the entire body is erroneous, as there is properly no mantle. The original generic name is accordingly inappropriate, and is changed by him to *Apera*, Heynemann. Jahrb. Mal. Gesell., xii, 17, t. 2, f. 5–7.

OLEACINA (VARICELLA) LEUCOZONIAS, Walch, p. 26.

Does not occur at Martinique, but Jamaica.

STREPTOSTYLA CATENATA, Pfeiffer. Pl. 11, fig. 81.

Somewhat solid, shining, irregularly striulate; yellowish horny, with a chestnut sutural band, and an interrupted one on the middle of the body-whorl. Length, 11 mill.

*Chiapa, Mexico.*

STREPTAXIS SUBORBICULA, Dohrn. Pl. 13, figs. 35–37.

This is *H. orbicula* of Pfeiffer and Küster, but not of Orbigny, according to Dohrn. (See Manual, p. 65.)

STREPTAXIS ORBICULA, Orb. Pl. 60, figs. 65–67.

I add figures copied from the original illustrations.

STREPTAXIS PLUSSENSIS, de Morgan. (Unfigured.)

*Malay Peninsula.*

STREPTAXIS GLOMUS, Albers. *Liberia.*

This unfigured Helix has recently been referred by Dohrn to Streptaxis.

GIBBUS (PASSAMAELLA) PASSAMAIANUS, Petit.

This section and species are referred (probably correctly), to Buliminus by von Martens (Conch. Mittheil., 144).

ENNEA CIRCUMCISA, Morelet. Pl. 60, fig. 68.

Sinuously rimate, somewhat solid, obliquely costulate, suture strongly impressed, not denticulate; grayish horn-color; whorls $8\frac{1}{2}$, the last attenuated at the base, and compressed around the umbilicus, and with a revolving sulcus on the last whorl parallel with the suture; aperture with a parietal lamina, and a tooth on the middle of the outer lip. Length, 7 mill.

*Toumby, near Landana, Equinoctial Africa.*

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ENNEA DOLIUM, Heude.

This name is proposed for *E. doliolum*, Heude, non Morelet. The paper in which the species is described and figured has not yet come to hand.

ENNEA FUCHSII, Gredler. (Unfigured). *China.*

DIPLOMPHALUS SEBERTI, Marie. (Unfigured). *New Caledonia.*

## Genus RHYTIDOPSIS, Ancey.

This group has recently been proposed for such species as *M. chelonitis*, Cr. (p. 117), and *R. Prevostiana*, Crosse (p. 123).

## Genus RHYTIDA, Albers, p. 117.

R. INDUTA, Tate (Related to *Lincolniensis*). (Unfigured.) *So. Australia.*

R. SINCLAIRI, Pfr., p. 121.

Johnson (Proc. Roy. Soc. Tasm., 1879) places in the synonymy of this species *Helix bombycina*, Pfr. (Pl. 60, fig. 69), and *H. vexanda*, and *H. dubitans* (unfigured). He states that the species is a variable one.

## Genus PARYPHANTA, Albers, p. 127.

The following unfigured species, recently described by Hutton under the generic name Amphidoxa, are to be added.

P. JACQUENETTA, P. PERDITA, P. CORNEA, Hutton. *New Zealand.*
P. NOVARÆ, Pfeiffer. (Unfigured.) *New Zealand.*

### Subgenus CALYMNA, Hutton.

*Whorls ribbed.*

P. COSTULATA, P. LAVINIA, Hutton. *New Zealand.*

ELÆA PORTIA, Gray. Pl. 60, figs. 70–72.

Narrowly umbilicated, rather thin, closely, arcuately plicate-striate, with scattered somewhat rigid hairs; corneous, strigate and maculate with reddish brown. Diam., 8 mill.

*New Zealand.*

Prof. Hutton writes (Trans. N. Z. Inst., 151, 1881), that there is a ribbed variety of *E. igniflua*, Reeve (p. 130, this work), which may be *Portia*, Gray; if so, Gray's name will stand for both.

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## Genus MABILLEA, Bourguignat, 1877.

The work in which this Algerian genus and five species thereof are described is unfortunately not accessible to me. It is supposed to be closely related to Trigonochlamys (p. 135).

## Genus HELICARION, Fér.

H. MINUTUS, Godwin-Austen, p. 182.

H. CHRISTIANÆ, Theobald, p. 176.

Godwin-Austen has recently referred the above to the group Durgella—which will be described in the next volume of the Manual.

H. BÖTTGERI, Hilber. Pl. 60, figs. 73, 74.

Narrowly umbilicated; dirty white, under a yellowish-green epidermis; body-whorl somewhat rugosely striate; suture with a small bright yellowish band; columellar callus very thin.

Diam., 17 mill. *China*, alt. 3500 metres.

### Subgenus ZONITARION, Pfeffer, 1883.

Jaw without middle tooth. *H. semimembranaceus*, Martens; *H. politissimus*, Beck; *H. crenularis*, Beck, etc., are members of this group.

## Genus OTOCONCHA, Hutton.

Shell external, of very few rapidly increasing whorls, all of which are open underneath. Animal limaciform, much too large to withdraw into the shell; mantle rather anterior, covering the shell; no locomotive disk, nor mucous caudal gland. Jaw with distant ribs. This genus appears to be allied to Peltella from Brazil and the West Indies.

O. DIMIDIATA, Pfeiffer (p. 181), is the type; it is one of the group which I have indicated as approaching Parmarion.

## Genus OTESIA, H. and A. Adams, 1855.

Shell heliciform, thin, subimperforate, lip simple. Animal similar to Helicarion. Mantle-lobe partly covering the shell.

This group was placed by Pfeiffer under Nanina, as a section, but its affinities are so decidedly Vitrinoid that I venture to give it a position following Helicarion. Gray described it in 1855 under the name of Vitrinella, already used by Adams for a group of Trochidæ. Albers (von Martens) in 1860, called it Medyla.

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O. VIRIDIS, Quoy and Gaimard. Pl. 60, figs. 77, 78.

Shell greenish yellow, with a yellowish band. Diam. 18 mill.

*Celebes.*

O. FLAMMULATA, Quoy and Gaimard. Pl. 60, figs. 79, 80.

Perforate, pellucid, smooth, thin; brownish with reddish-brown flames. Diam., 12 mill.

*Celebes.*

O. TECTA, Souleyet. Pl. 60, figs. 75, 76.

Heliciform, orbicularly convex, perforate, smooth, thin; pellucid, yellowish green. Diam., 13 mill.

Near *Touranne, Cochin China.*

O. SEPOSITA, Benson. (Unfigured.) *Darjiling, India.*

## *LIMACIDÆ* (p. 185).

"Die nackten Landpulmonaten des Erdbodens," by Dr. F. Heynemann, is a very complete paper on the distribution of the snails, with critical remarks on the species. It is published in Jahrb. Deutsch. Mal. Gesell, xii, 1885, and comes to hand too late to permit me to incorporate its features with my text.

### Genus LIMAX, Linn. (p. 189).

L. MAXIMUS, Linn. p. 189.

Var. CARBONARIA, Böttger (Pl. 60, fig. 81). Much smaller than the type; blackish, the shield somewhat constricted across the fore-part, rugæ more numerous than in var. *atra.*

*Greece.*

Var. SUBMACULATA, Böttger (Pl. 60, fig. 82). Much smaller than the type; brown, maculated on the body, the shield unicolored; sole light brownish.

*Greece.*

### Genus VEGA, Westerlund.

The description is too imperfect to indicate its systematic position.

V. NORDENSKIOLDI, Westerlund (unfigured). *Ceylon.*

### Genus OTHELOSOMA, Gray.

A problematical animal from the Gaboon region of W. Africa, said to resemble somewhat the Dunlopia or land leech of Ceylon.

O. SYMONDSII, Gray. (Unfigured.) *W. Africa.*

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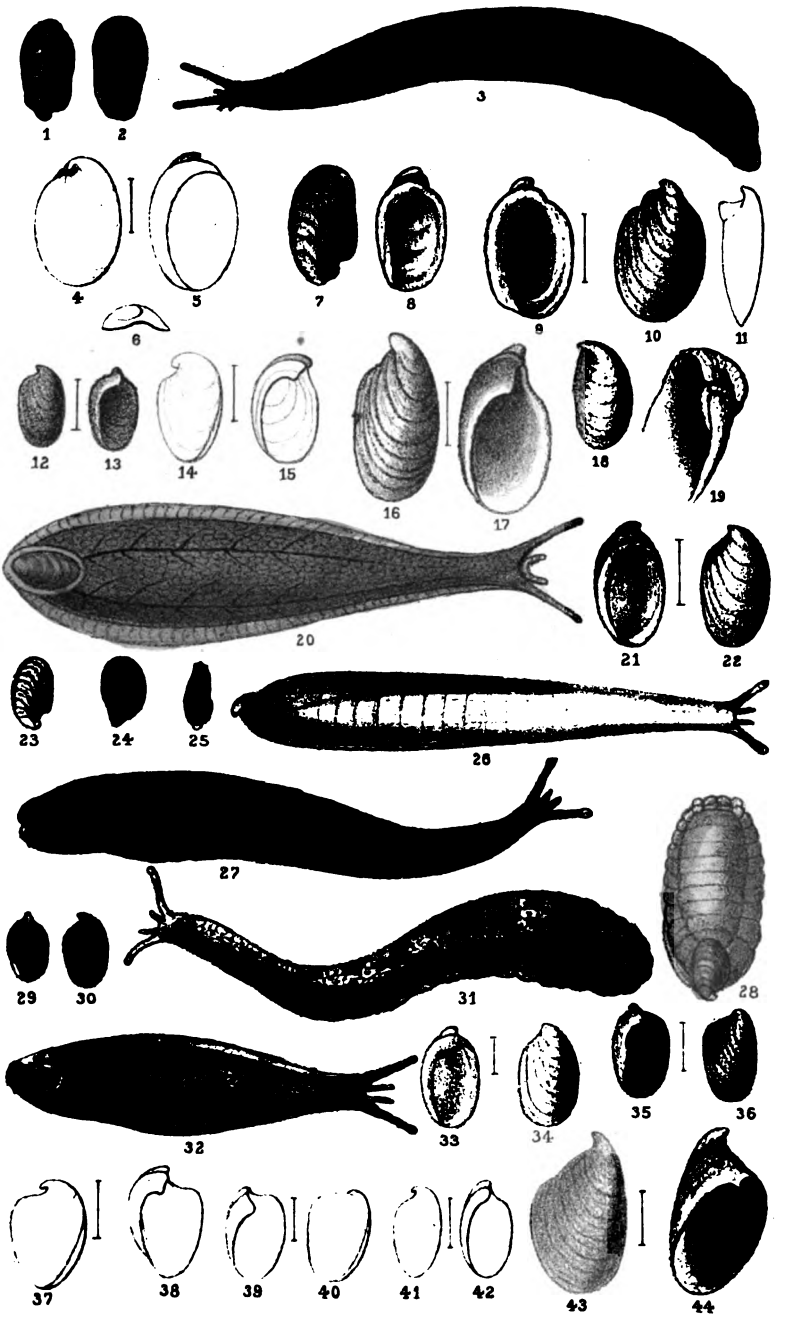


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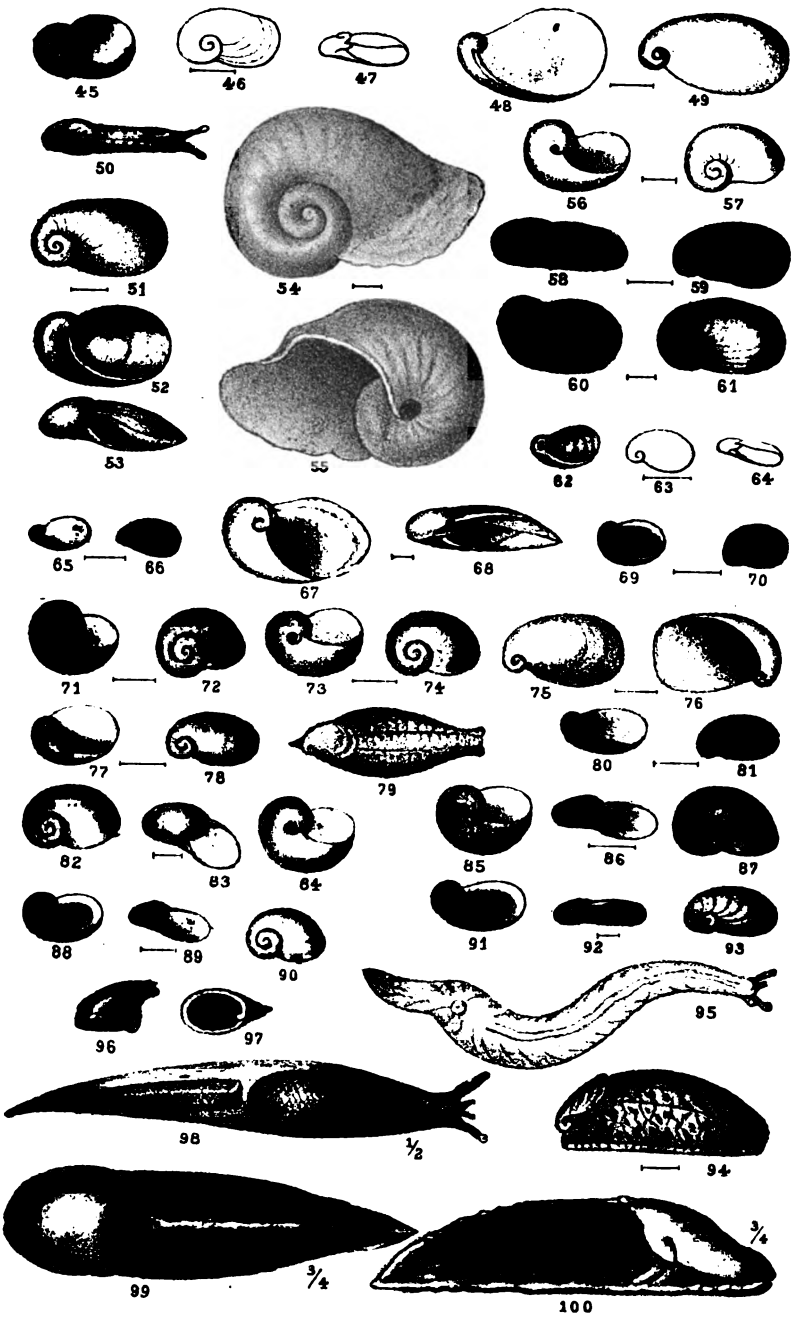


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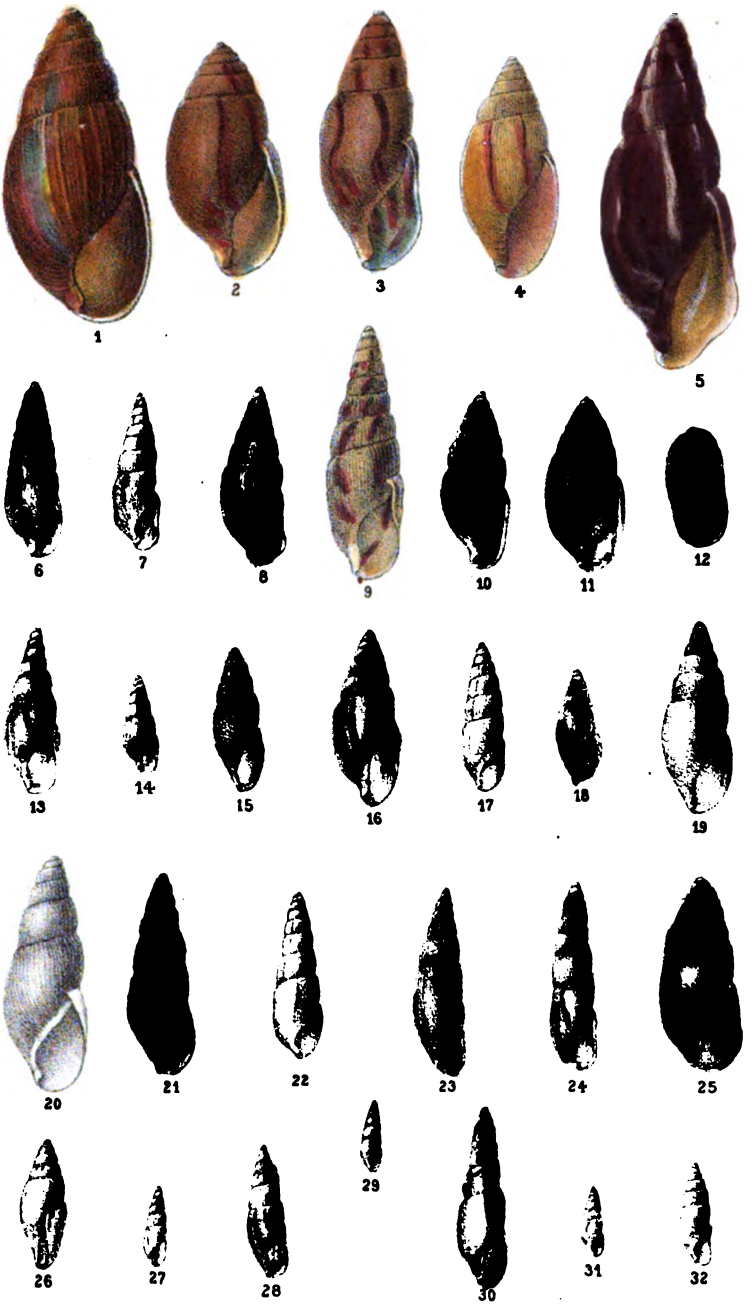


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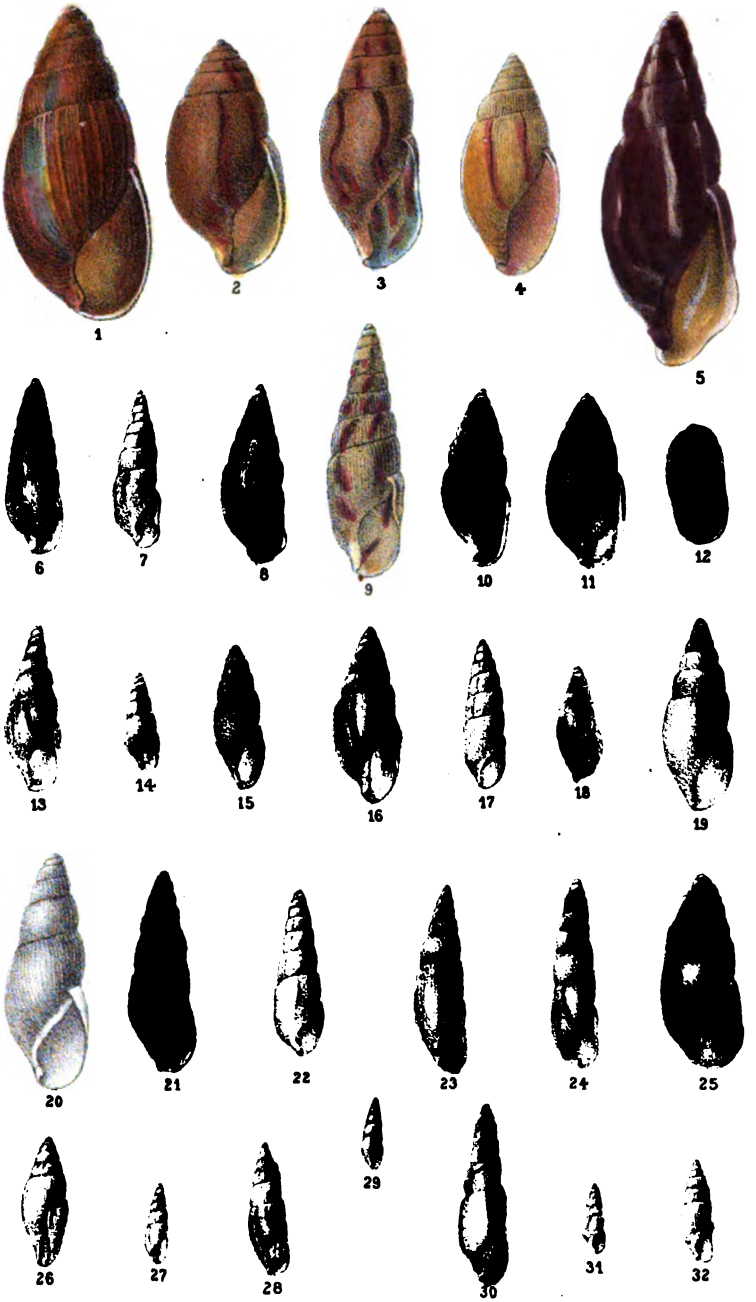


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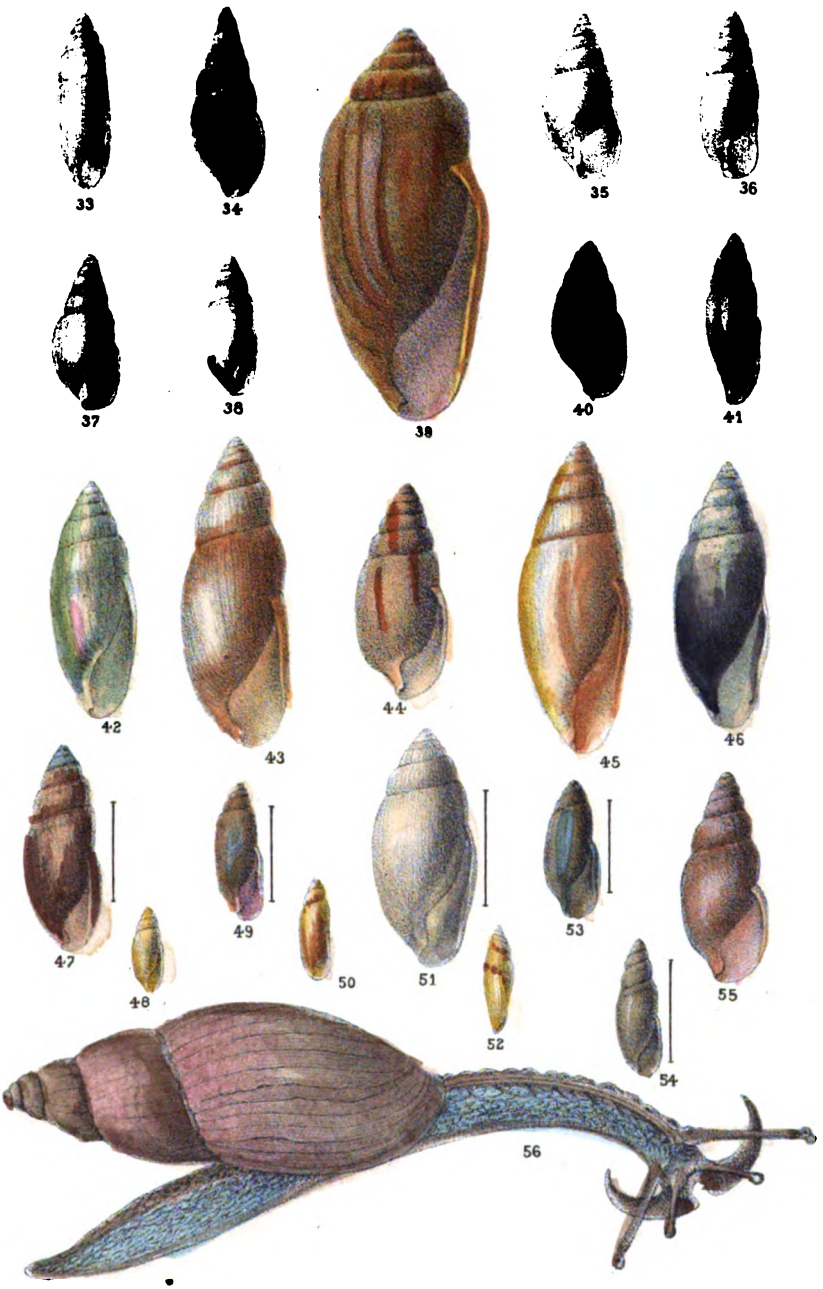


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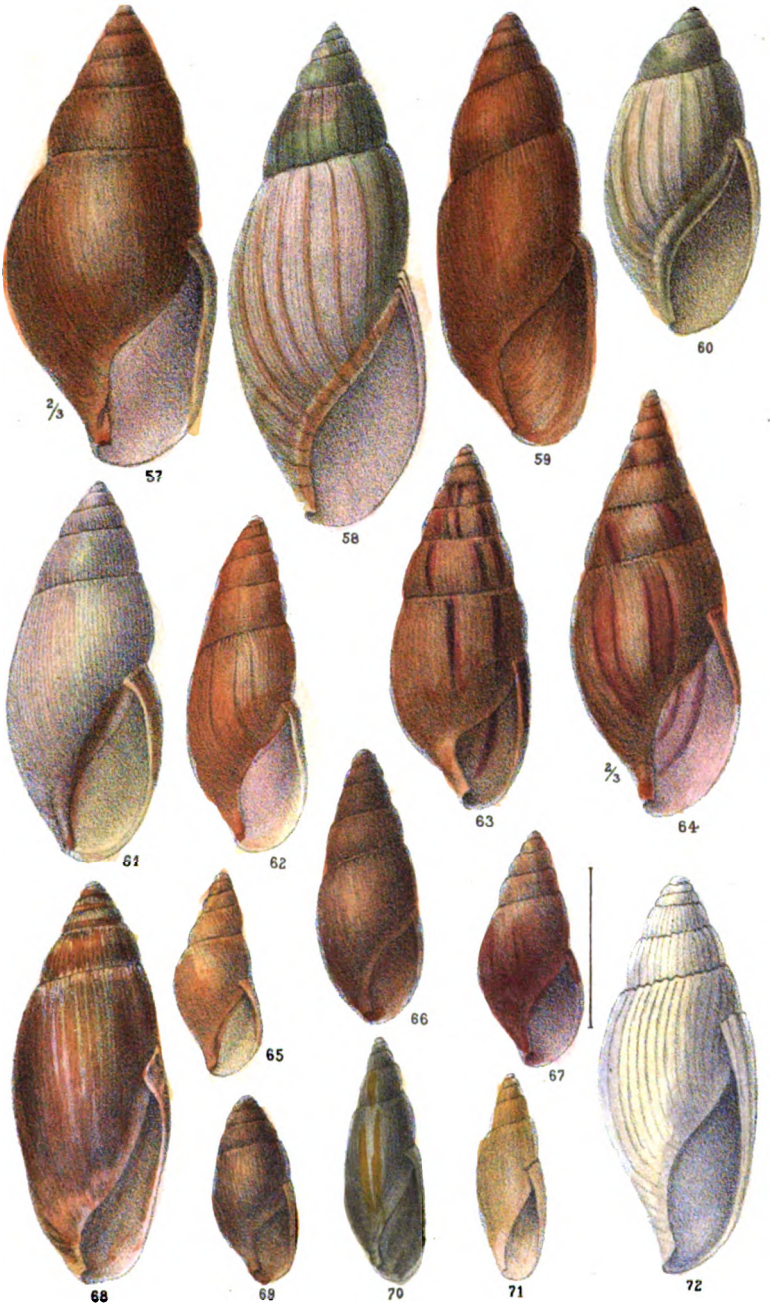


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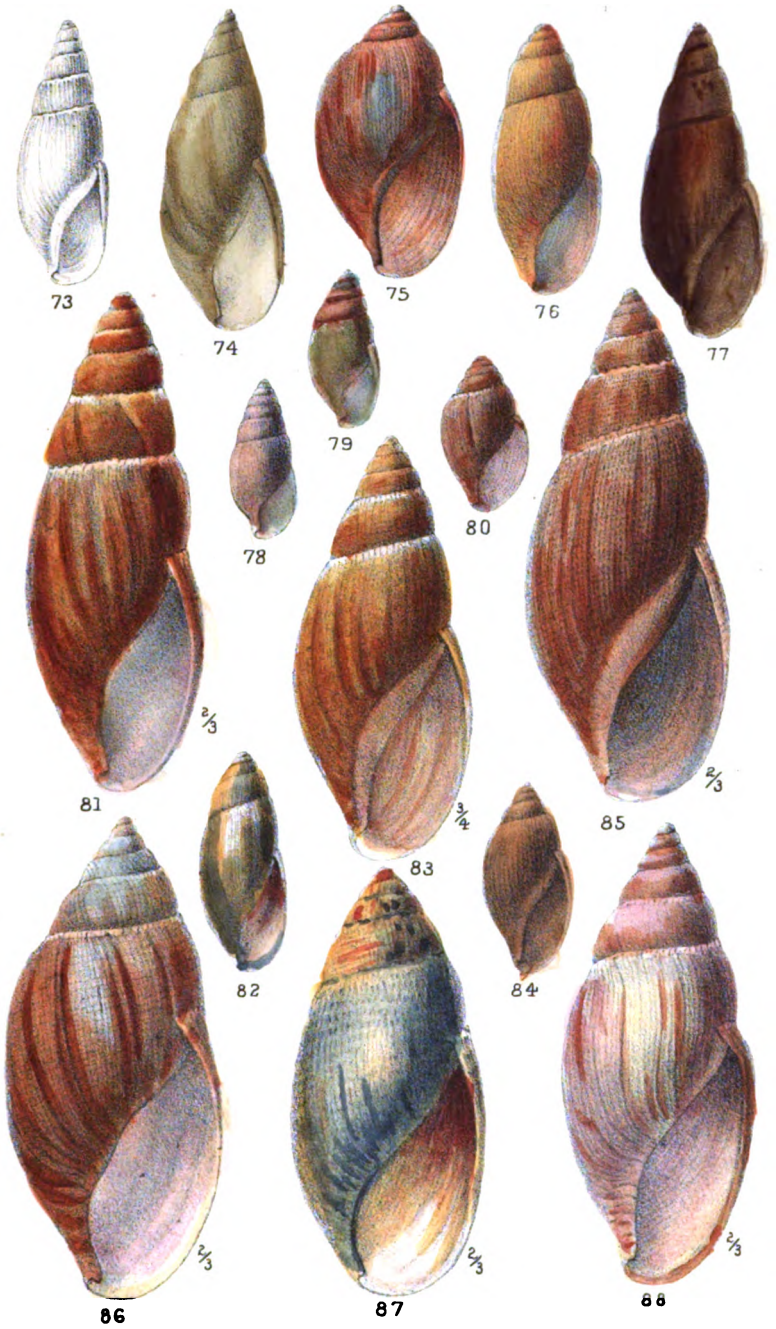


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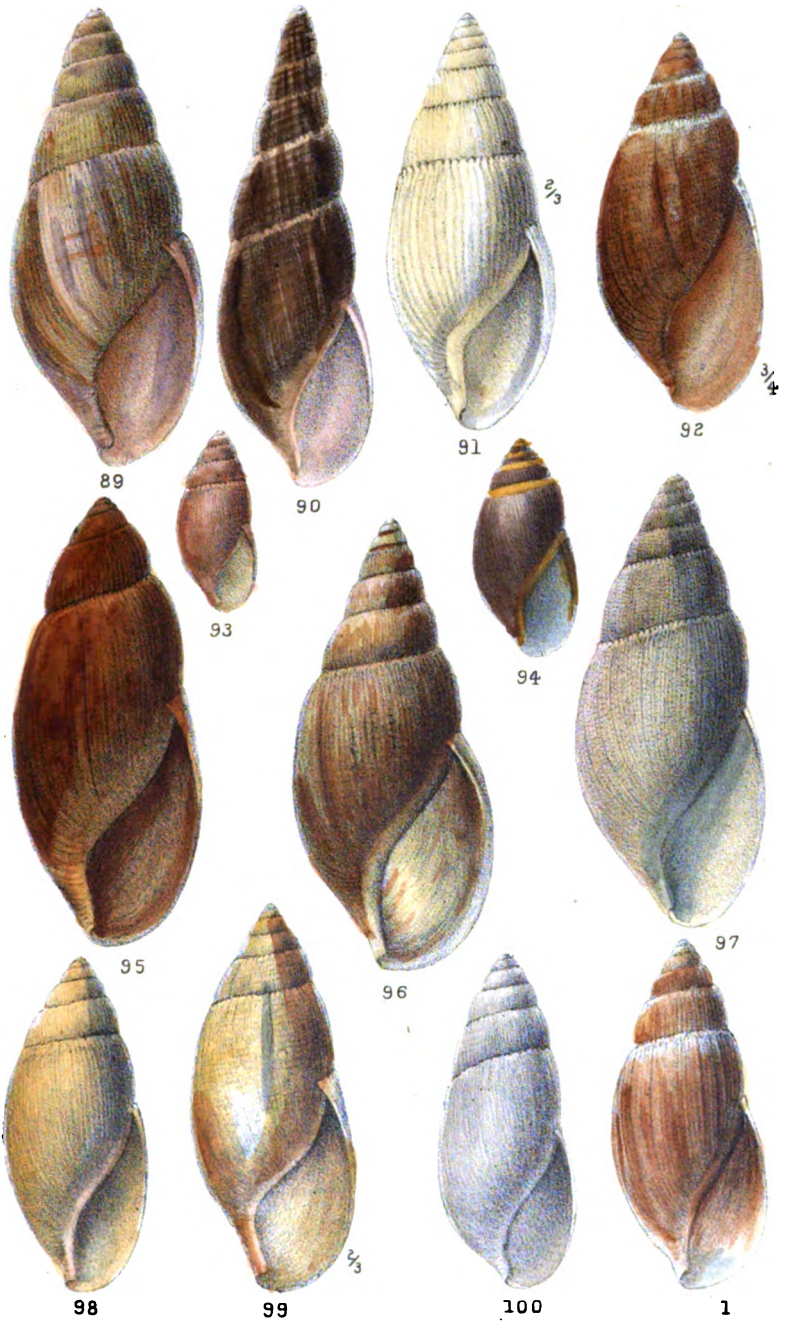


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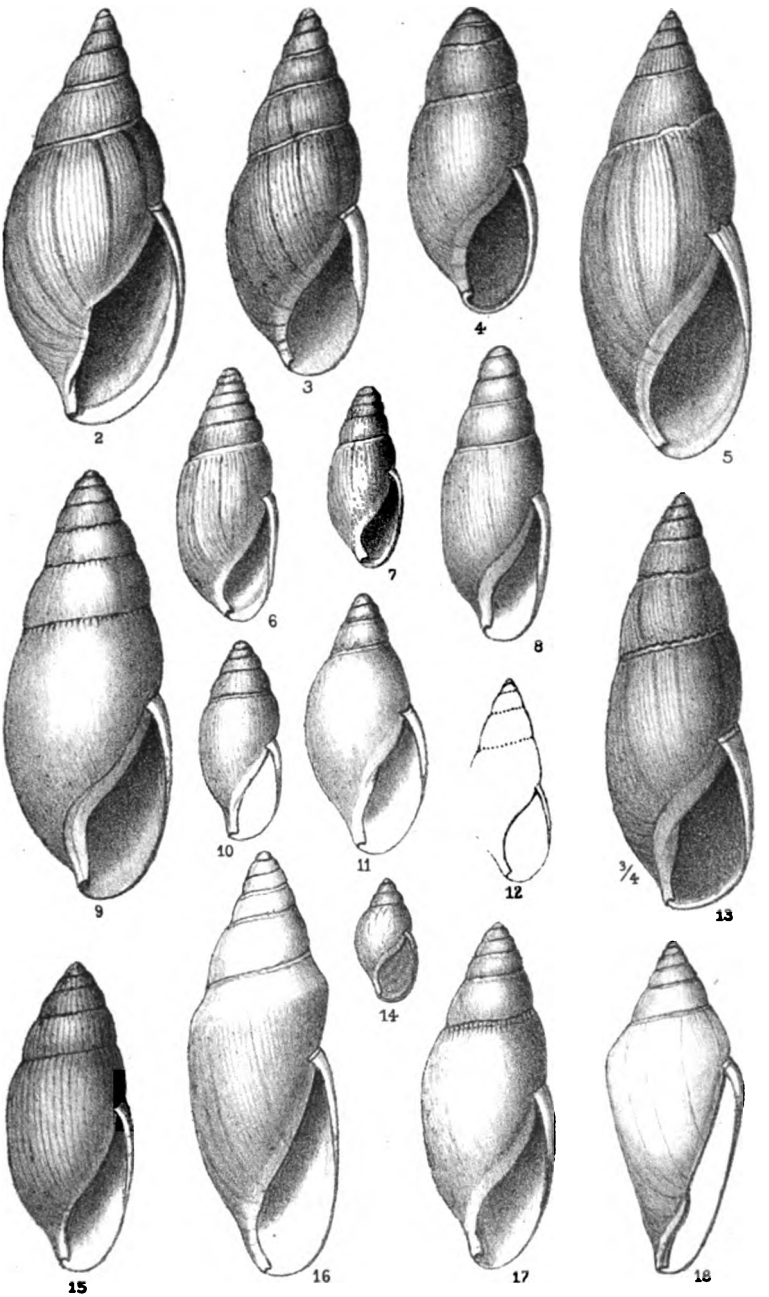


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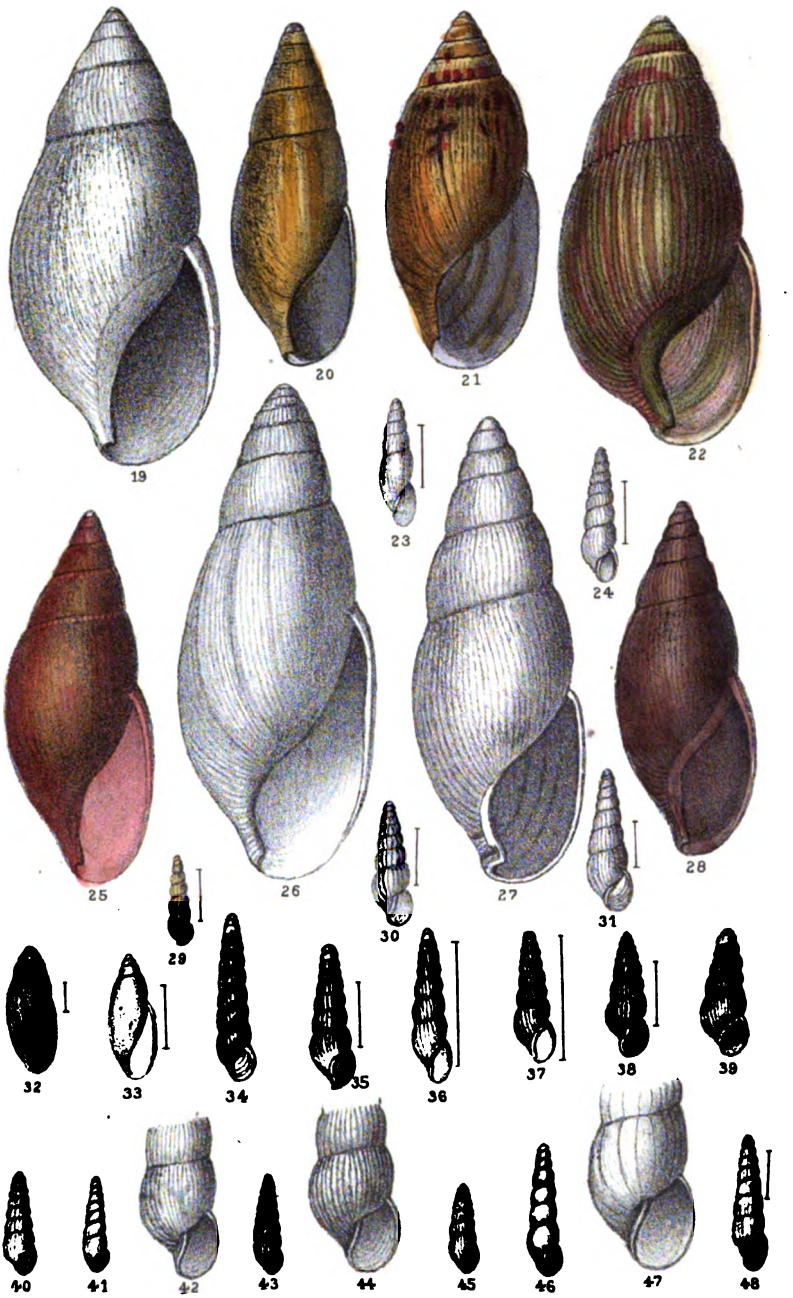


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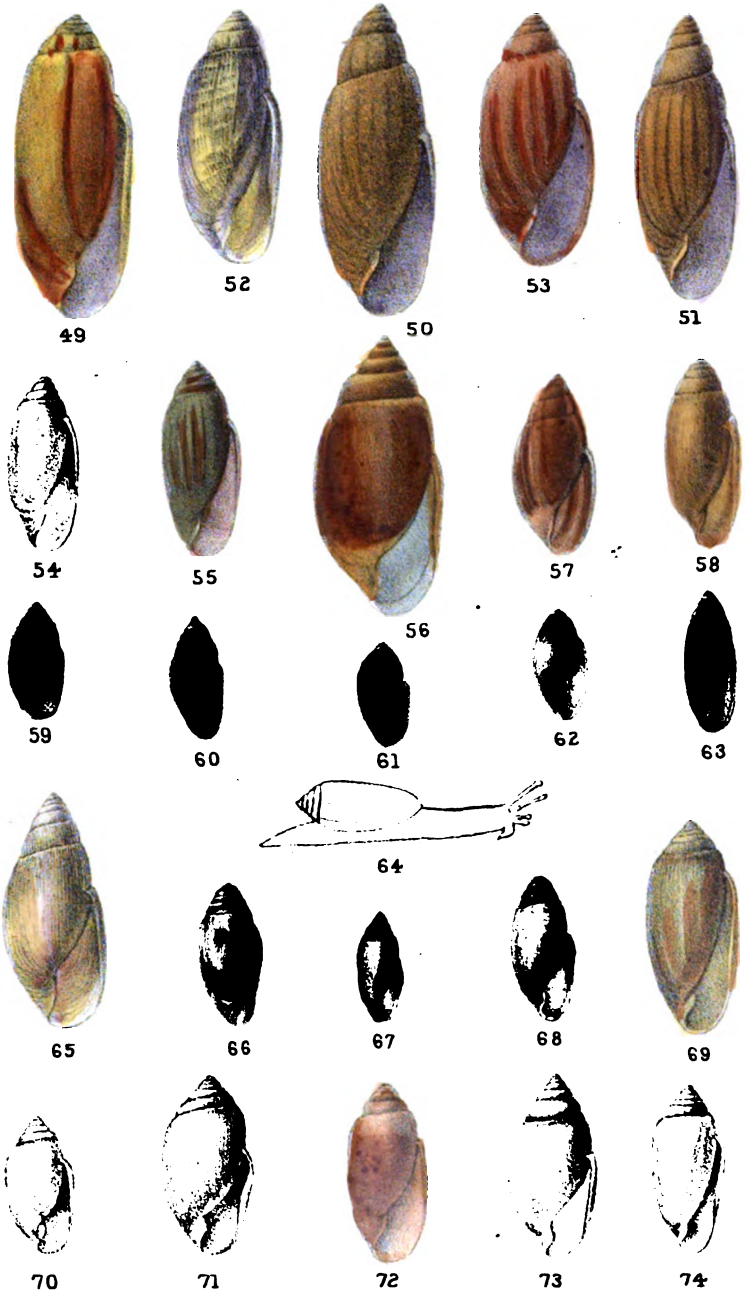


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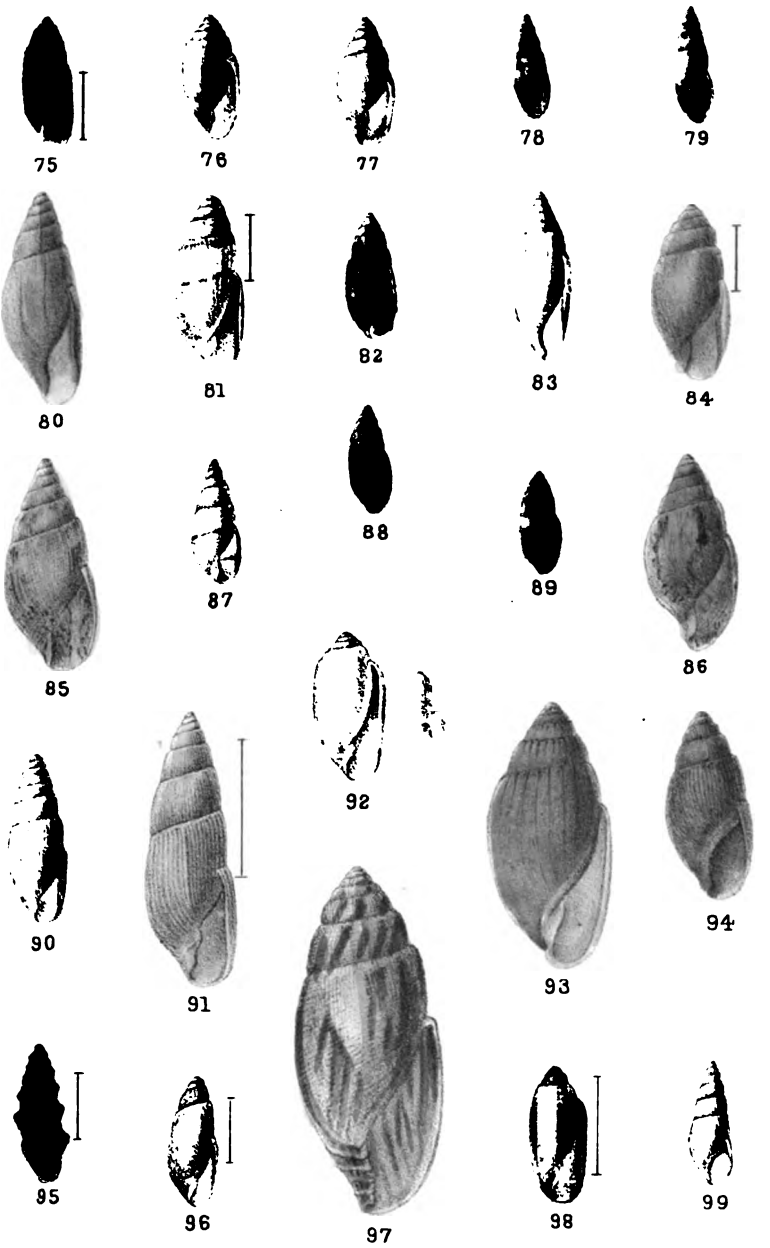


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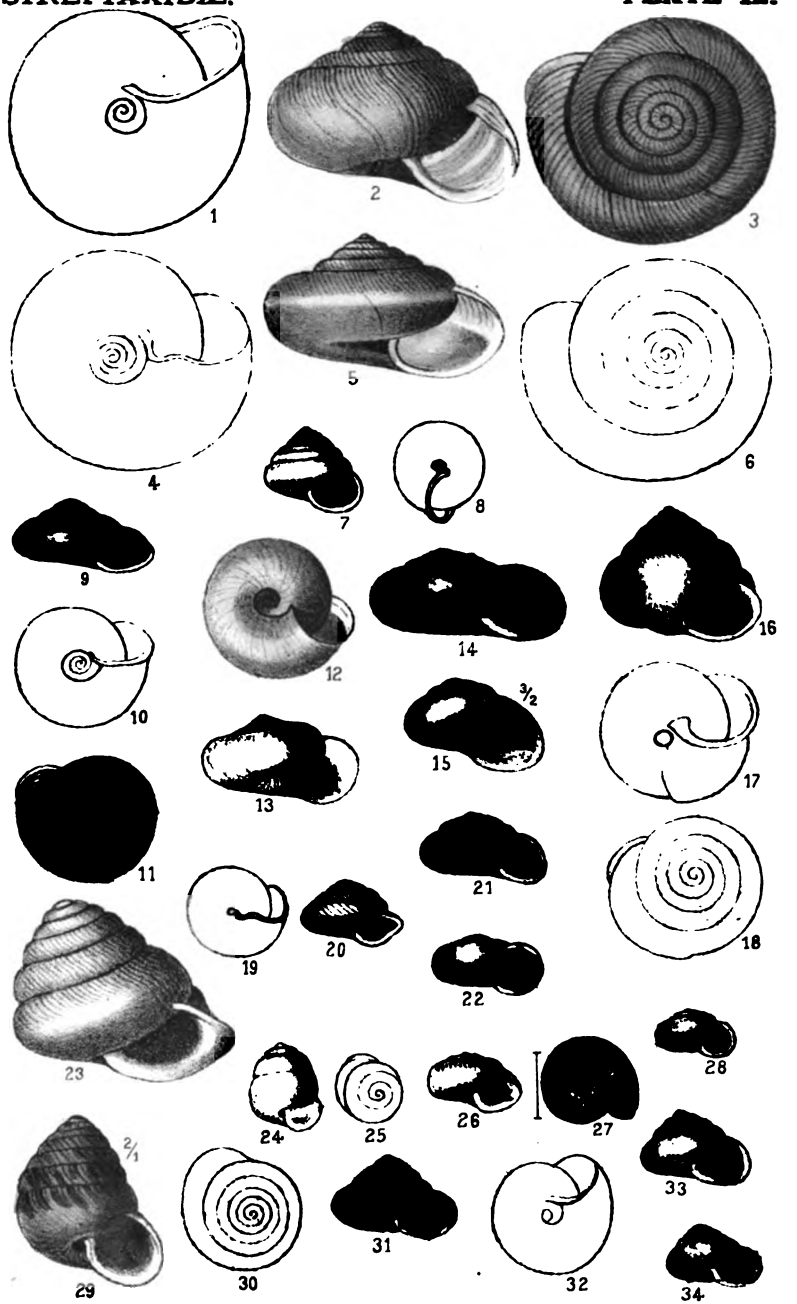


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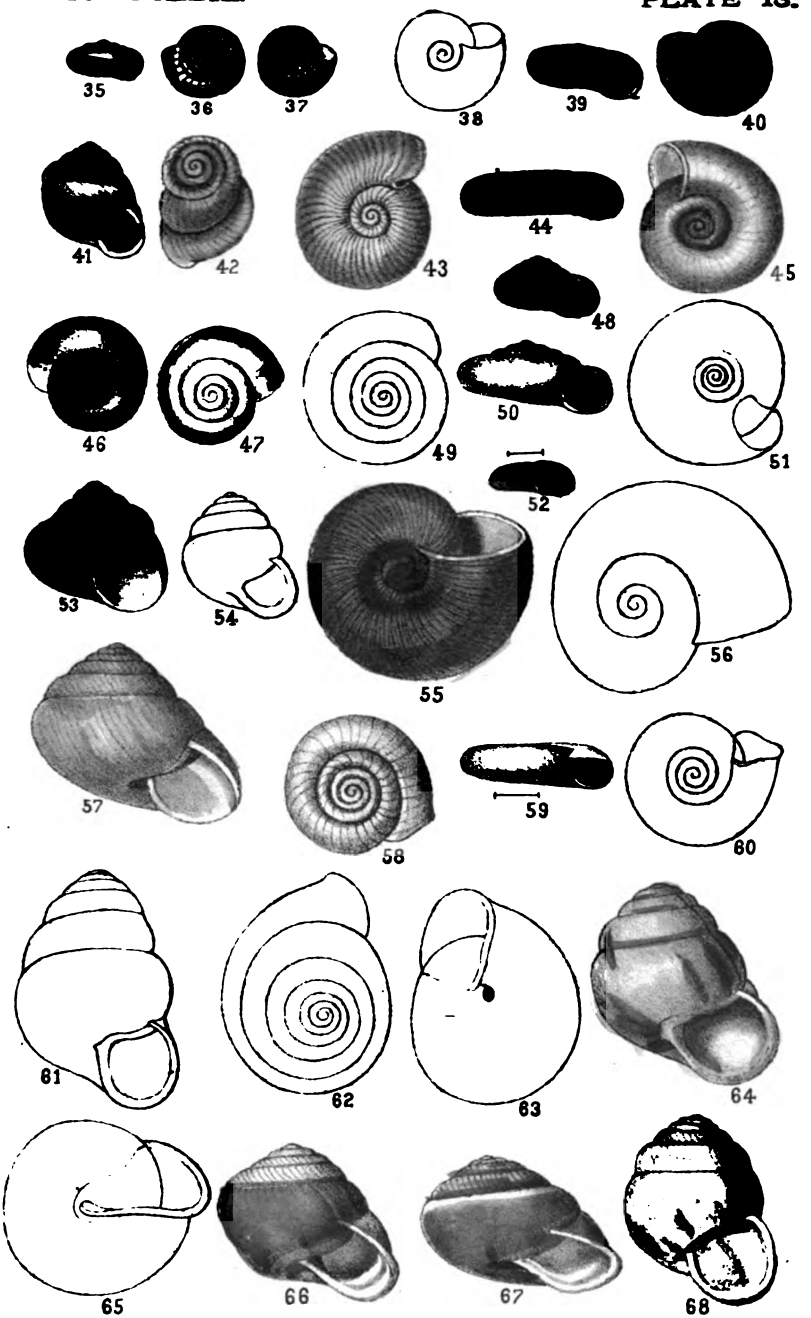


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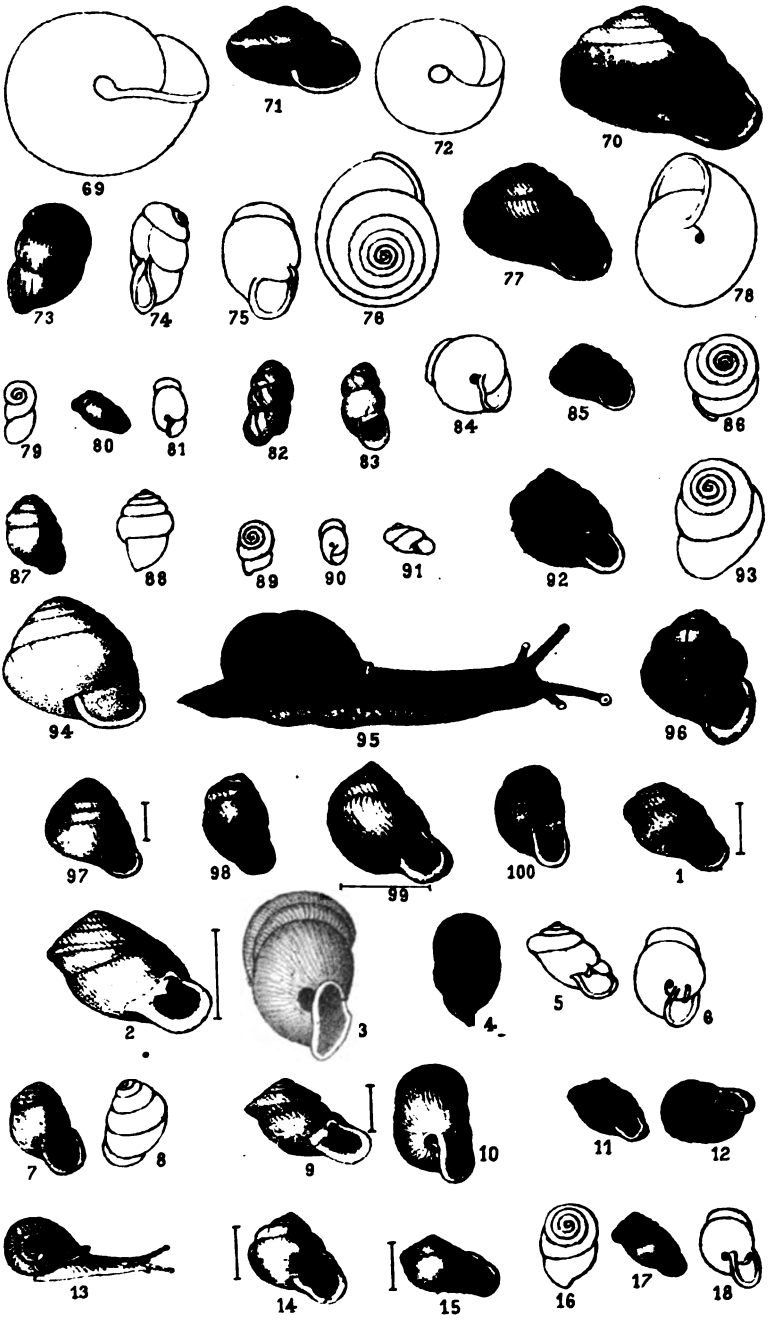


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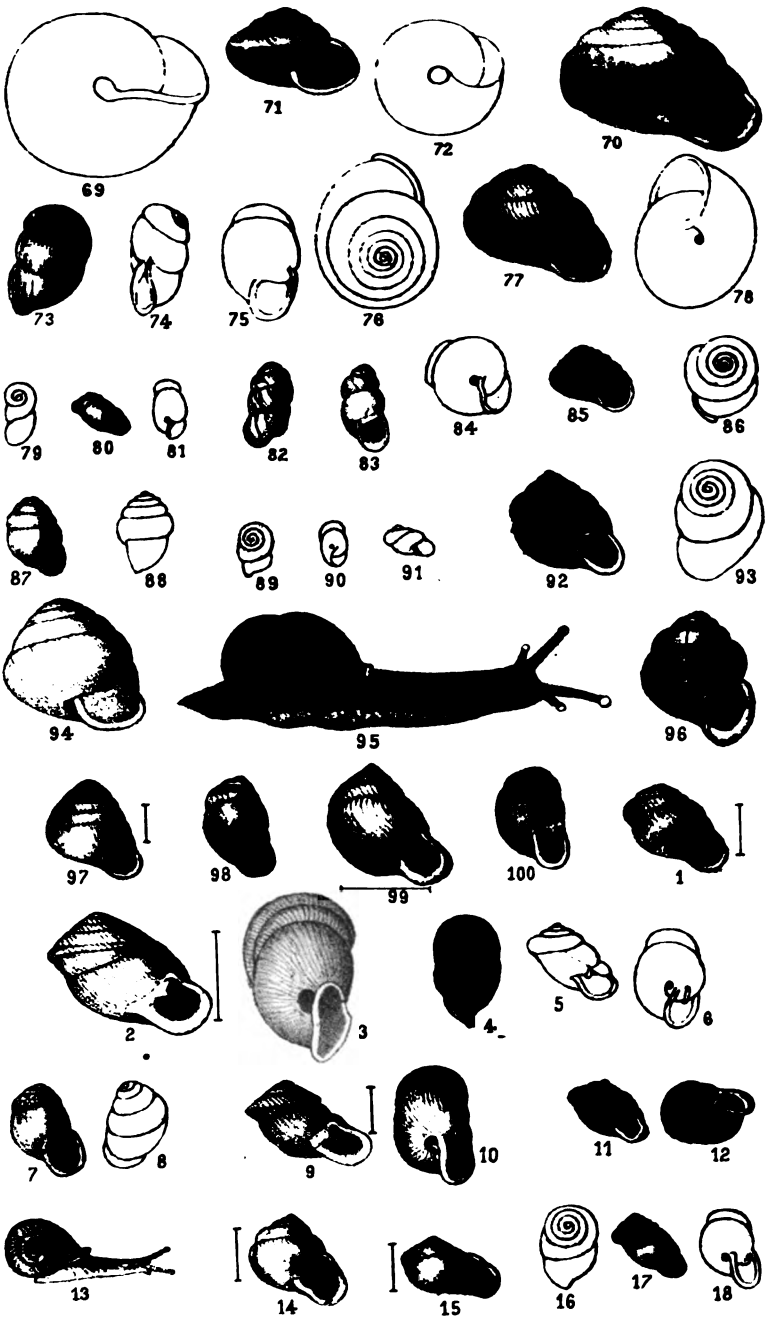


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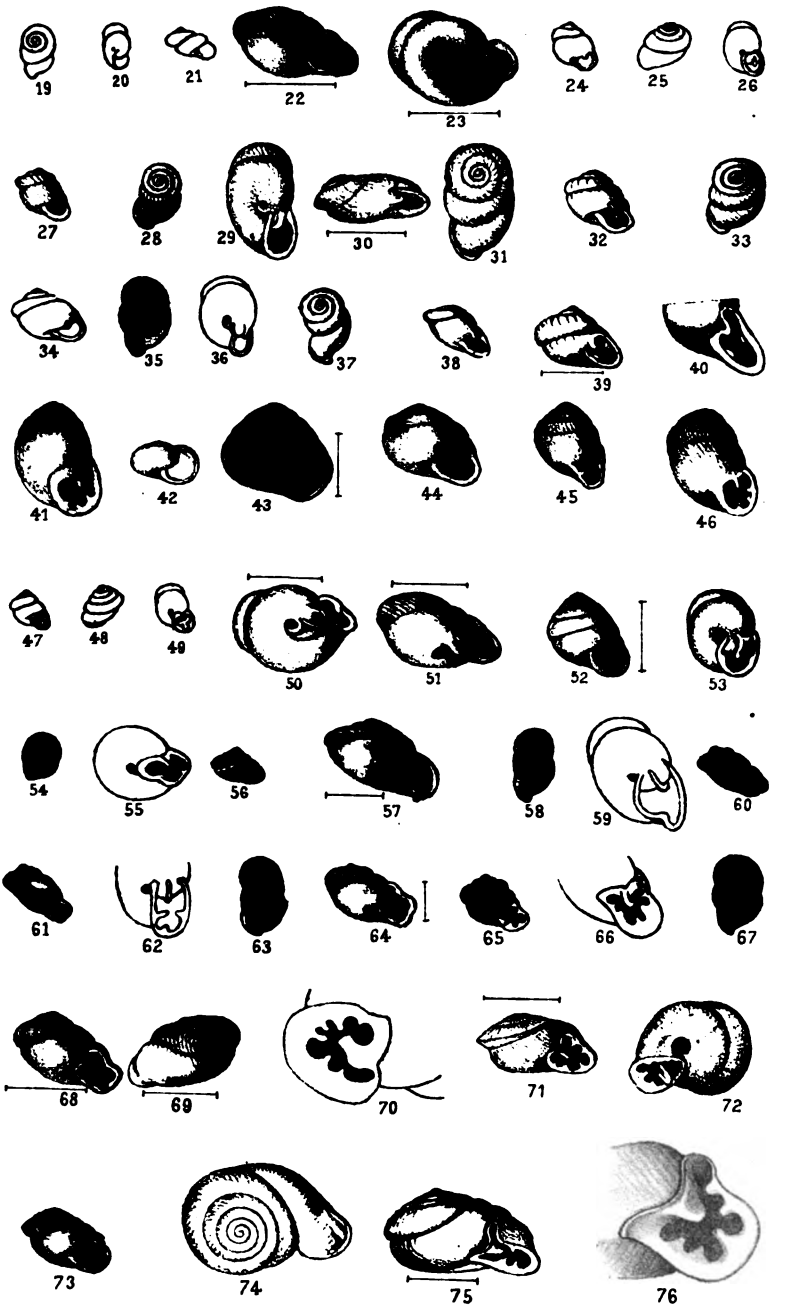


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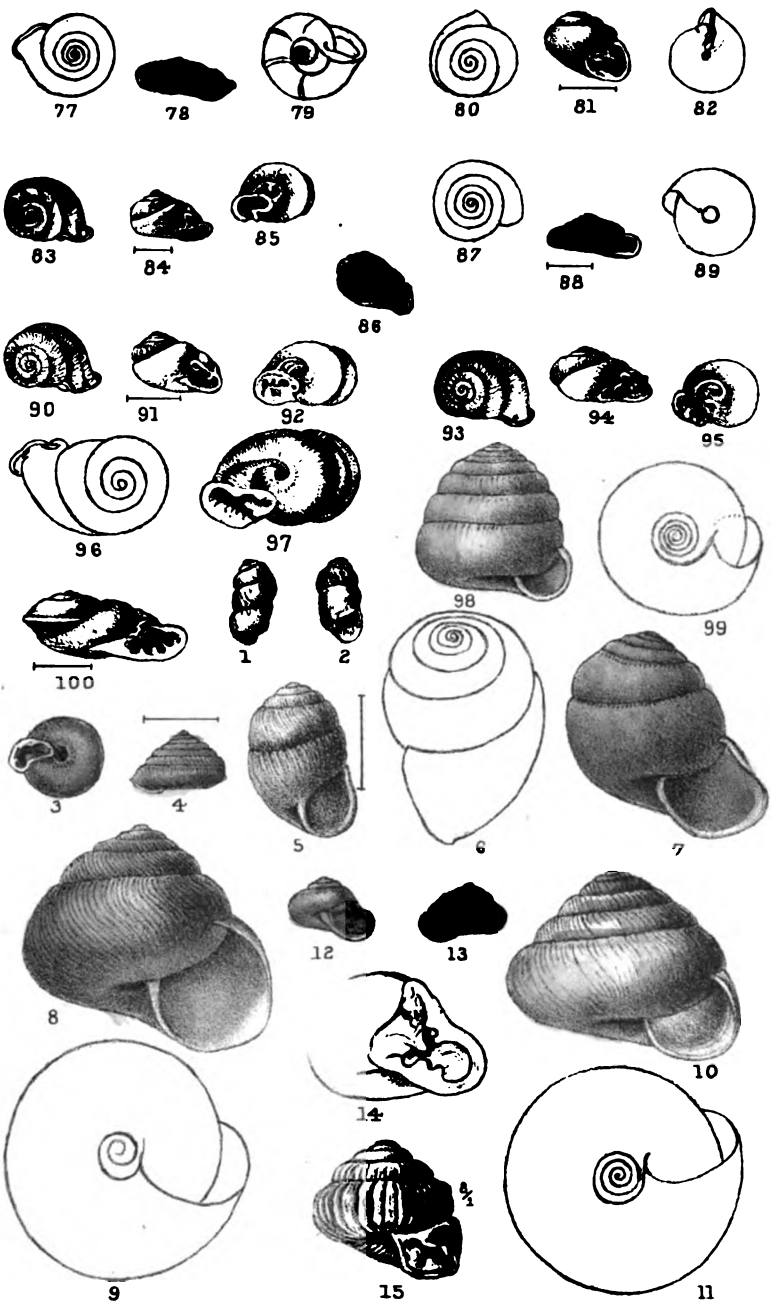


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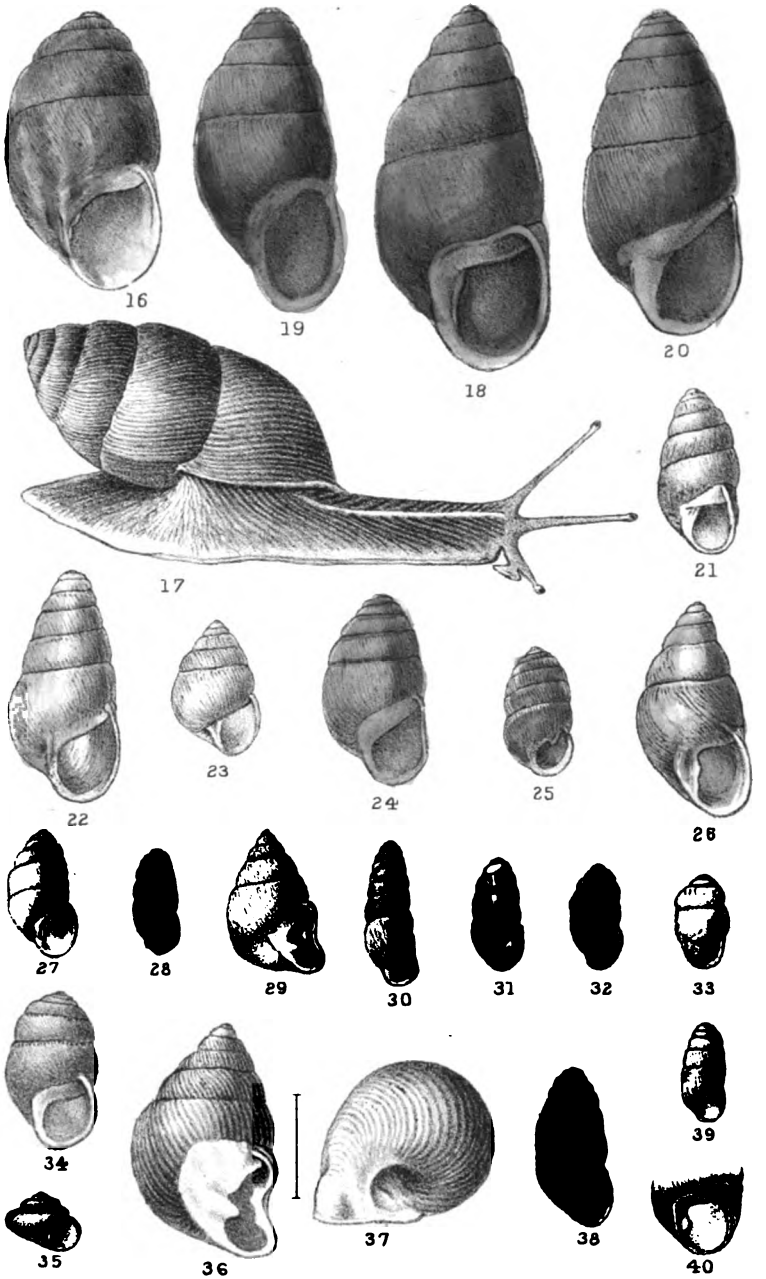


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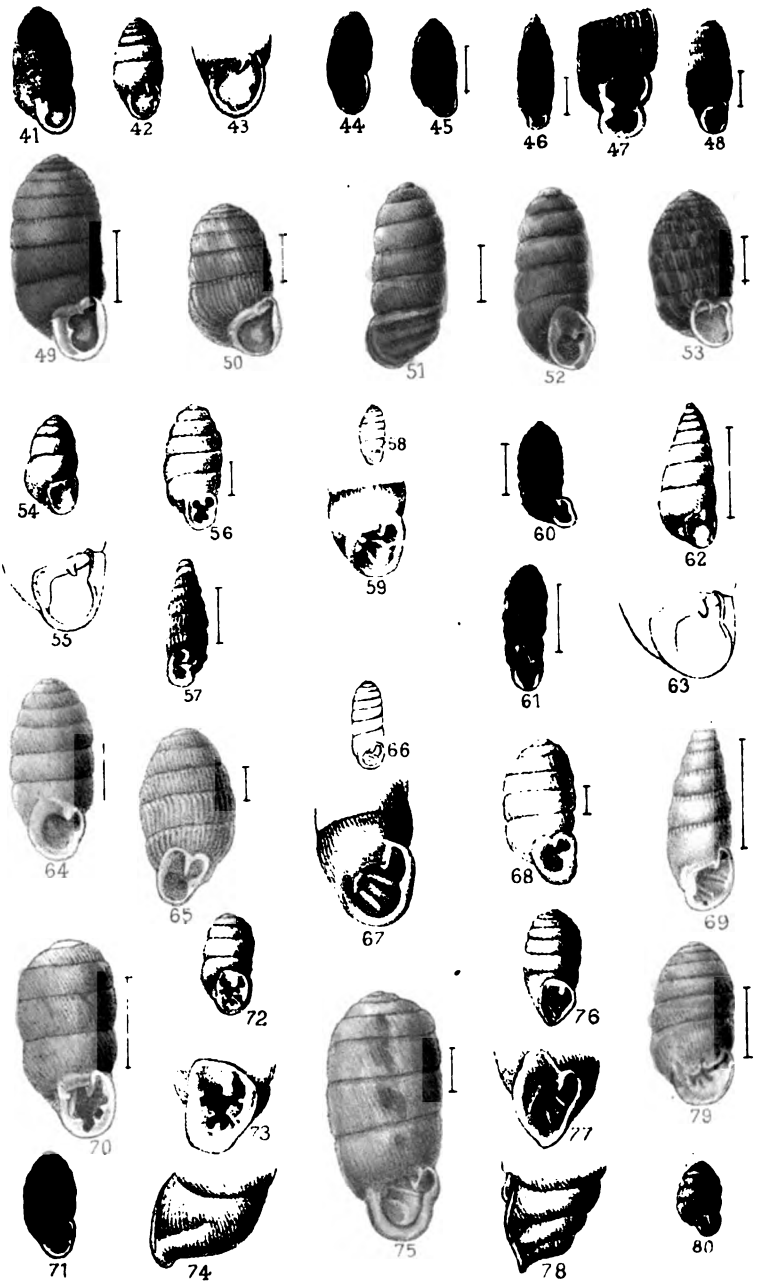


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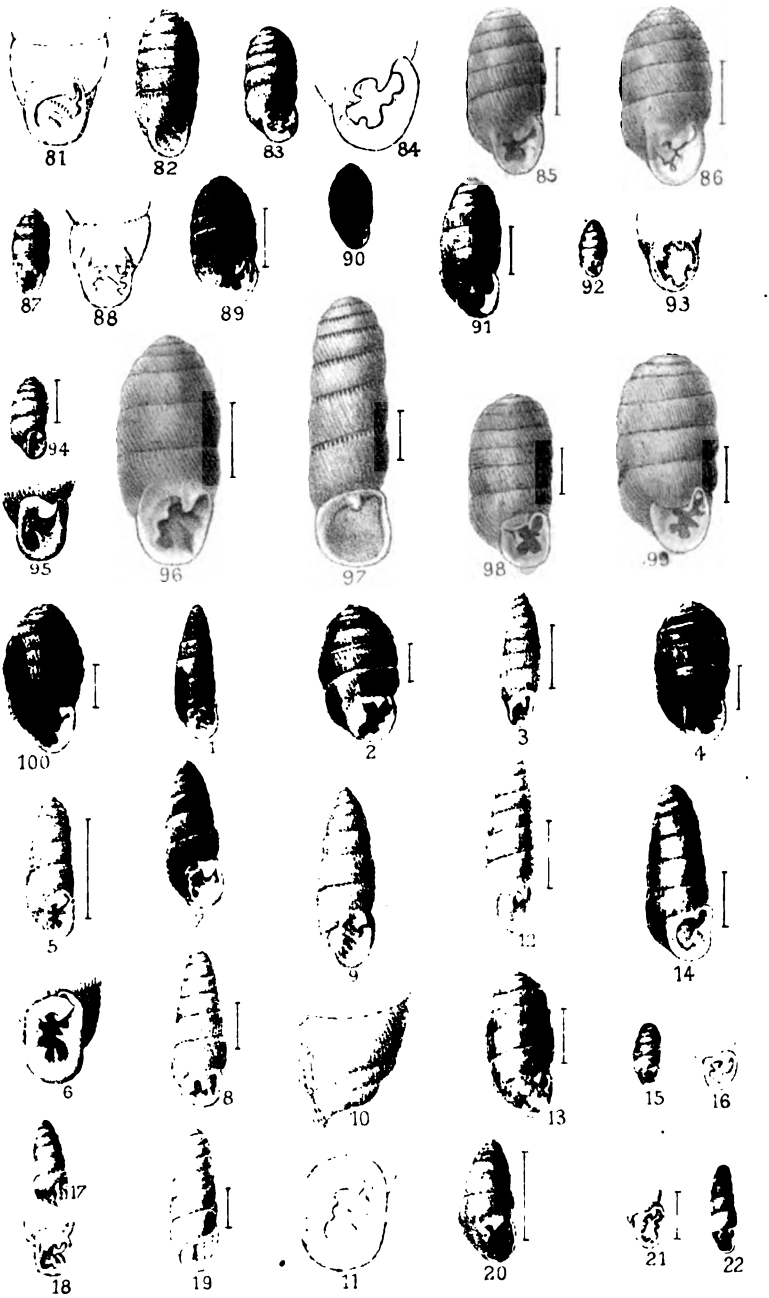


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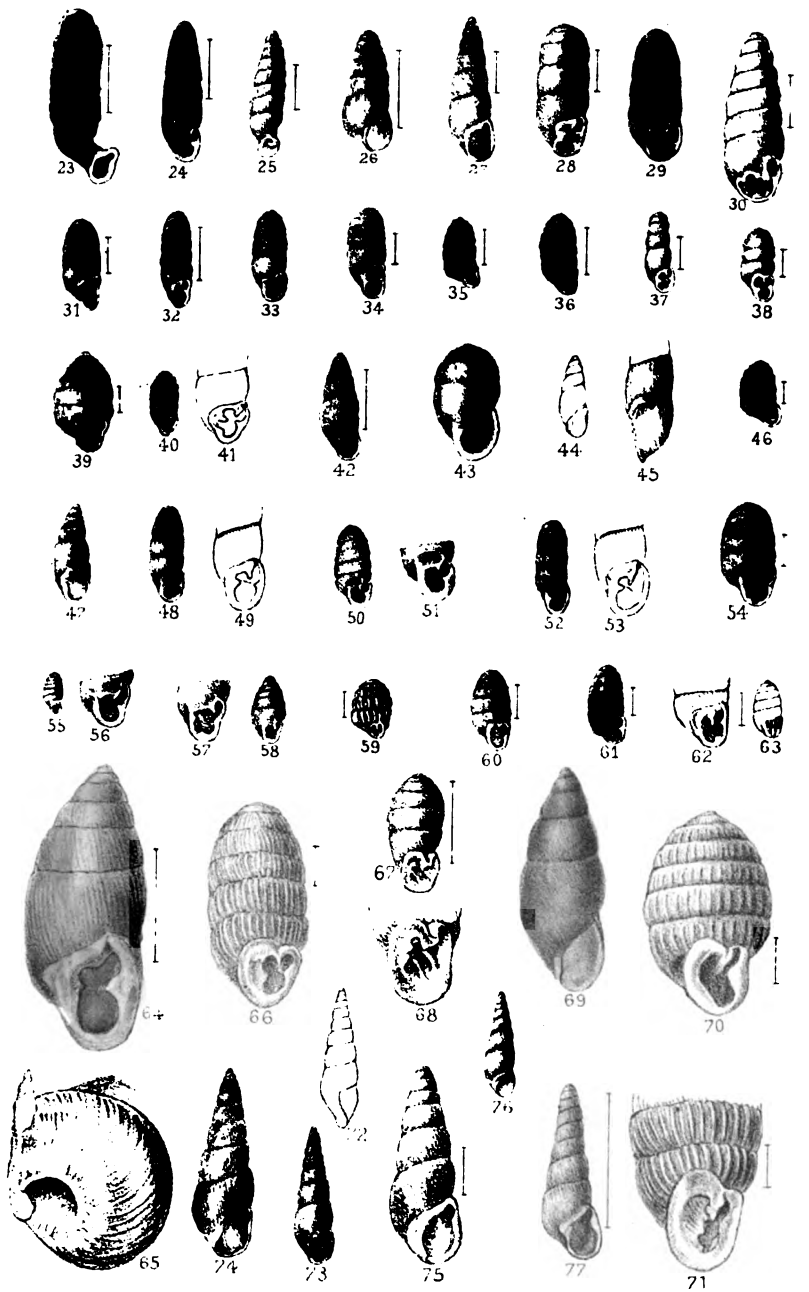


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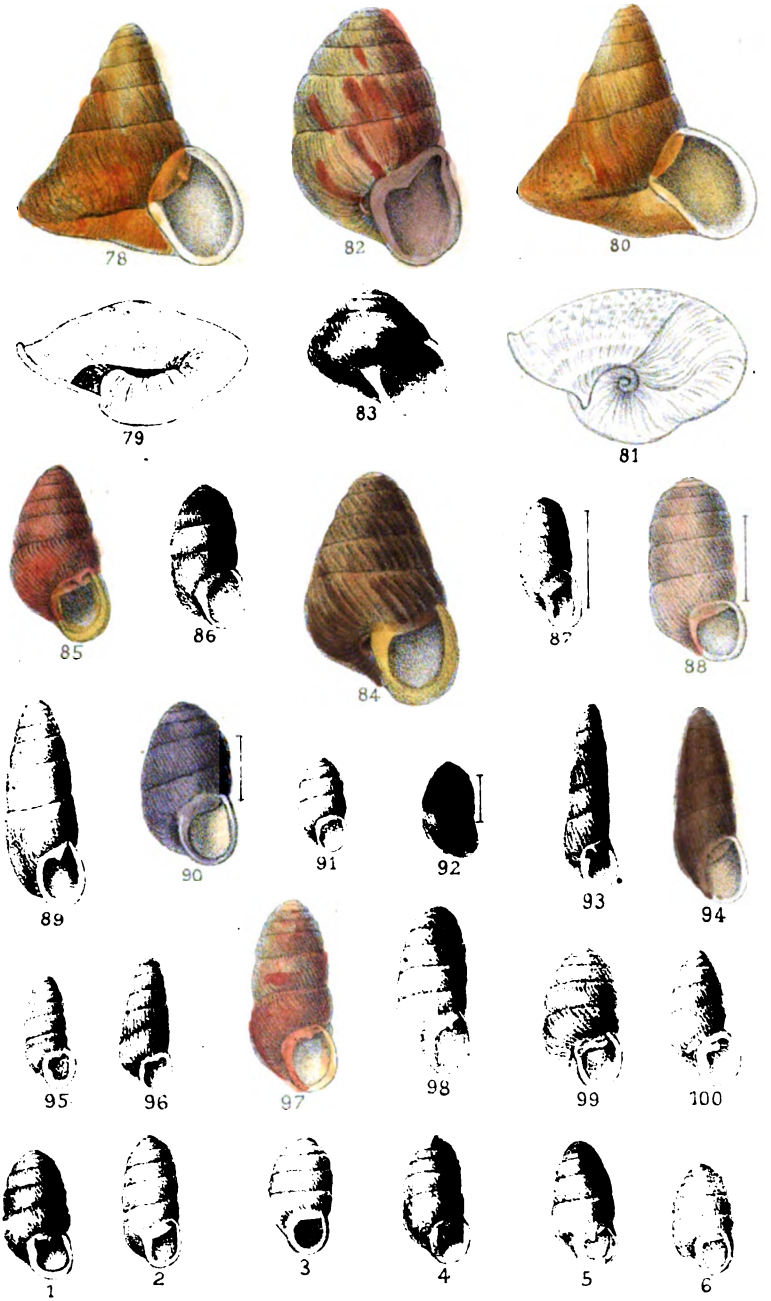


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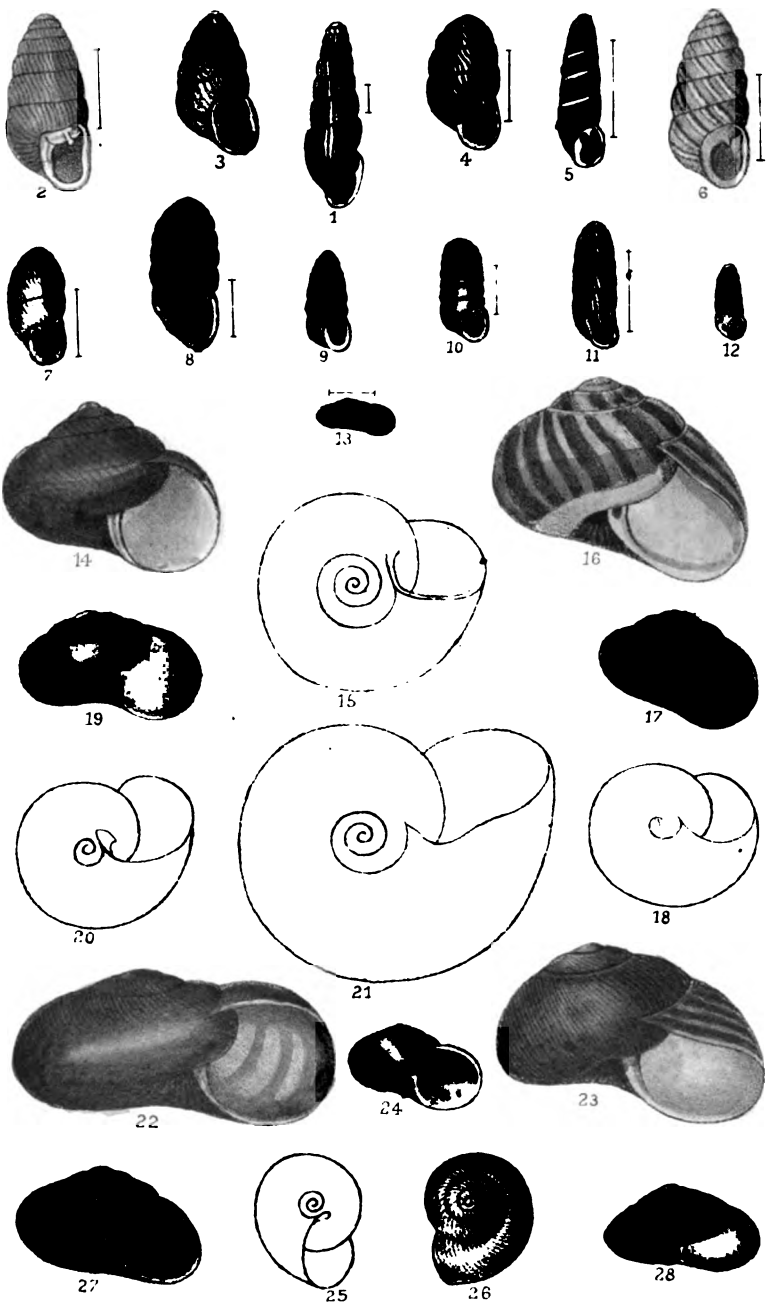


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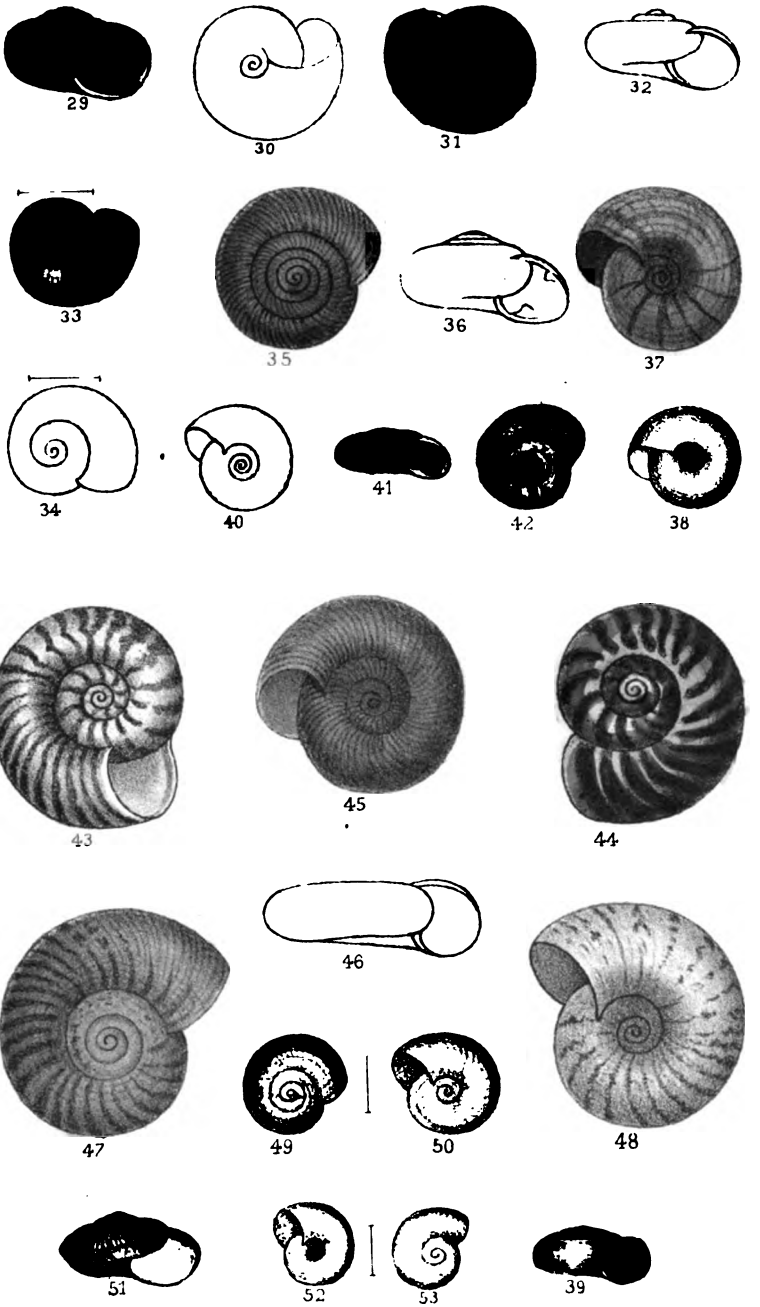


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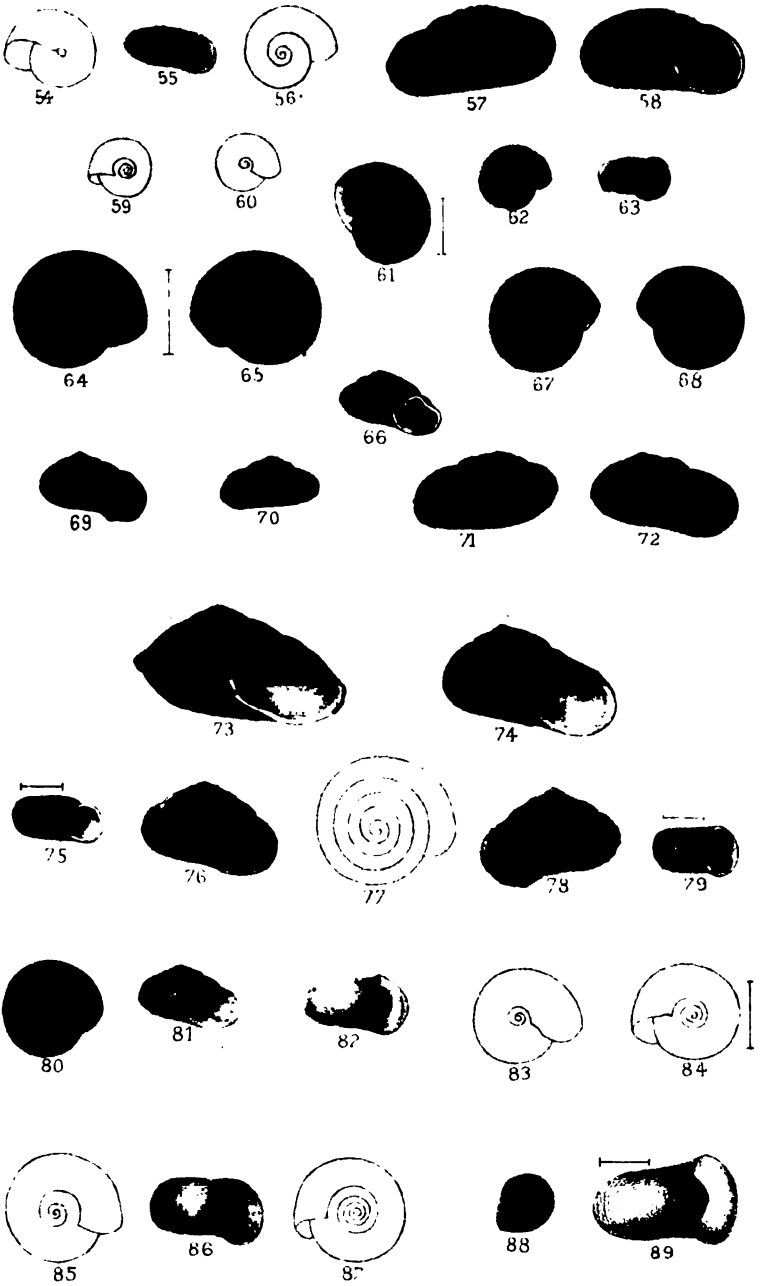


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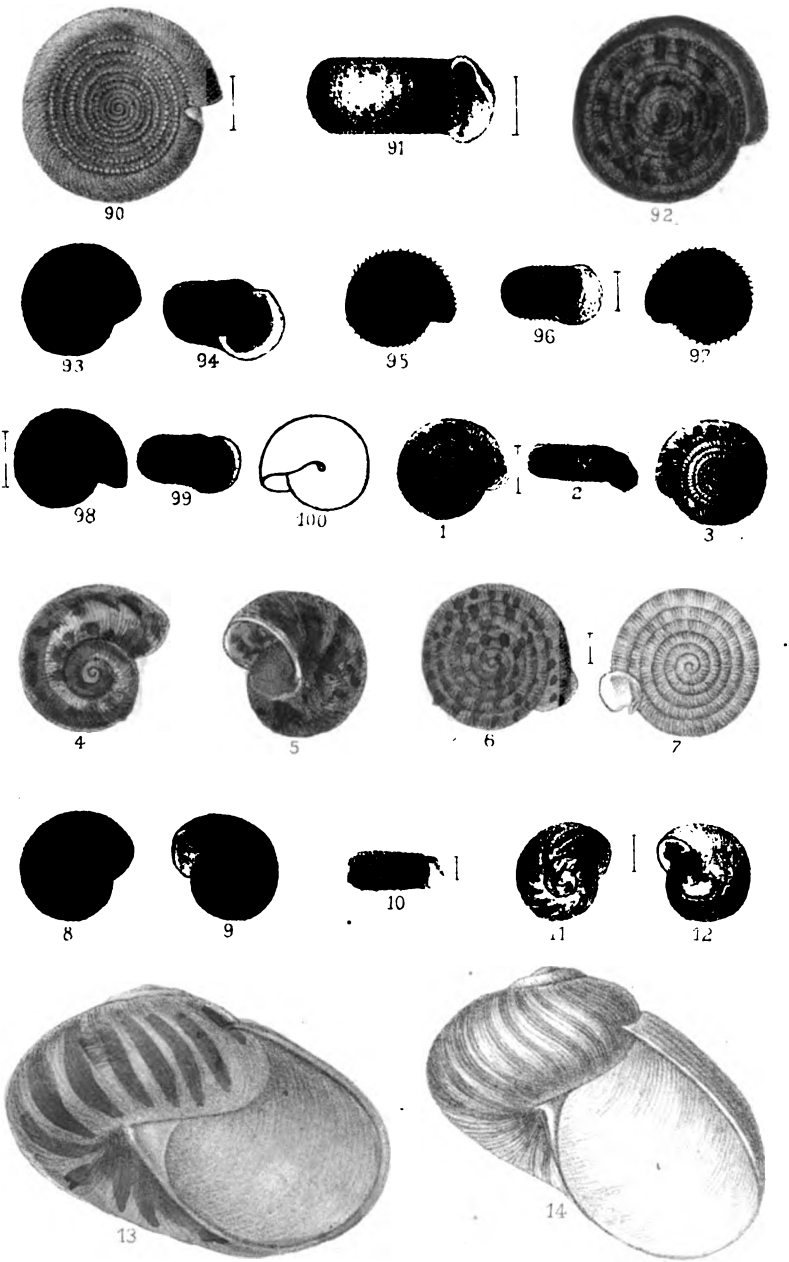


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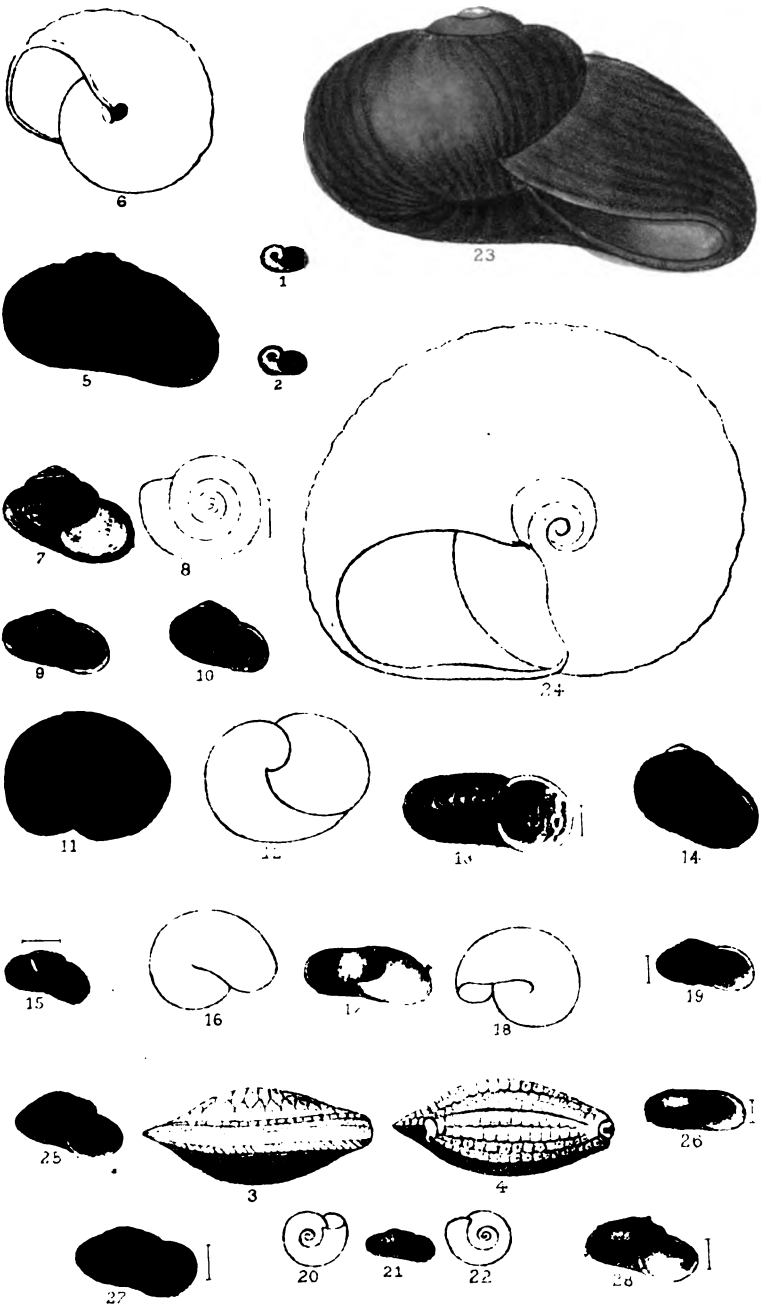


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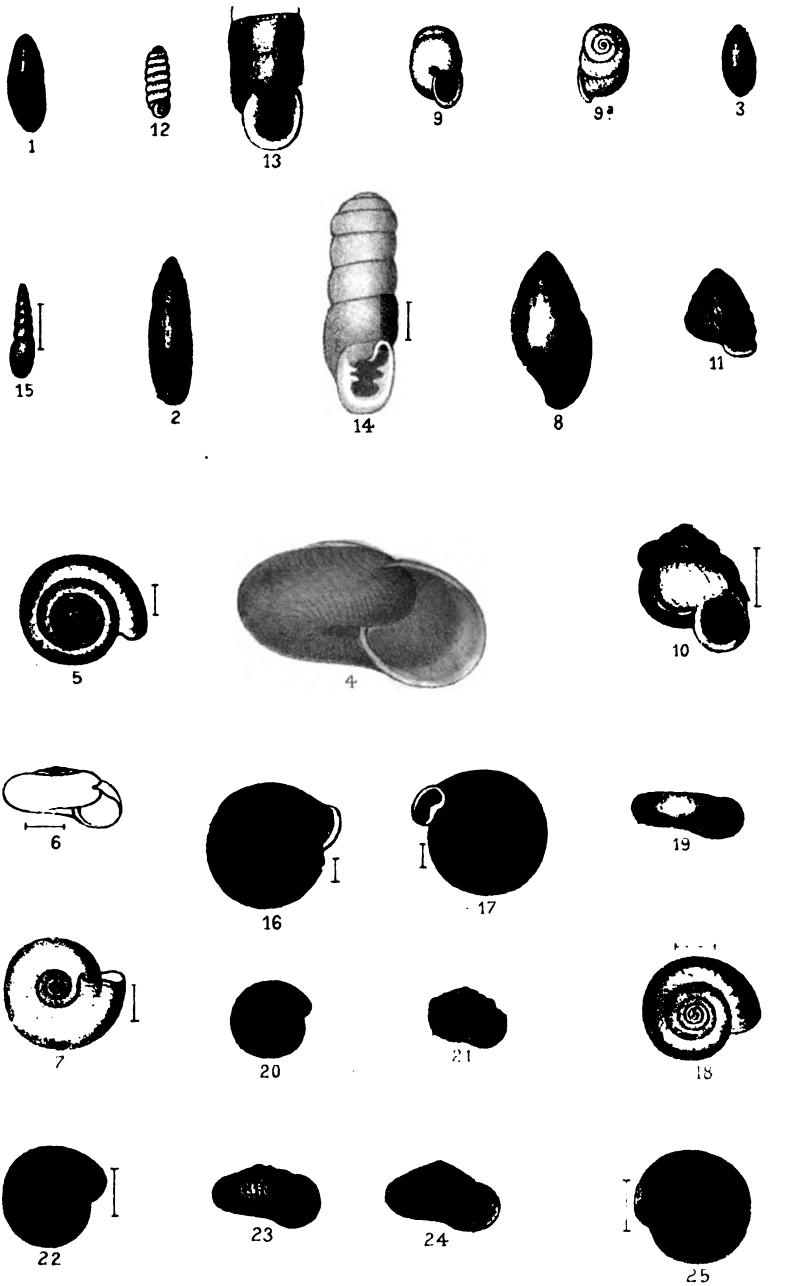


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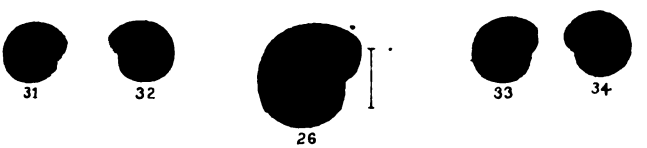


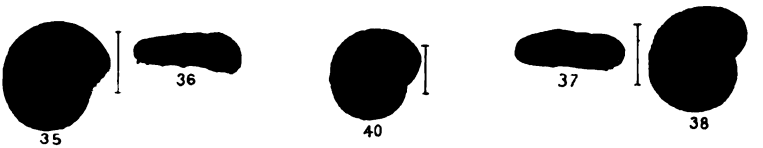


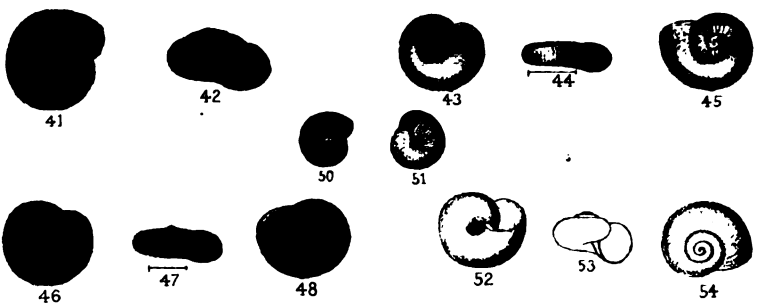


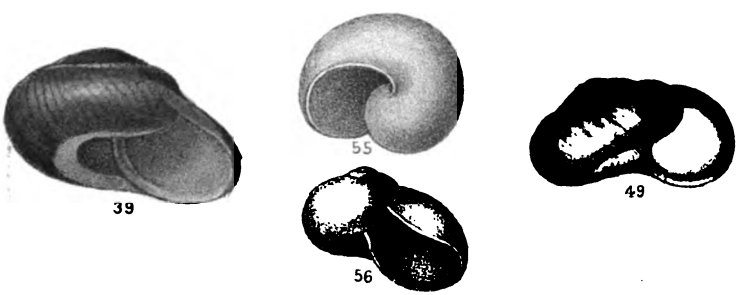


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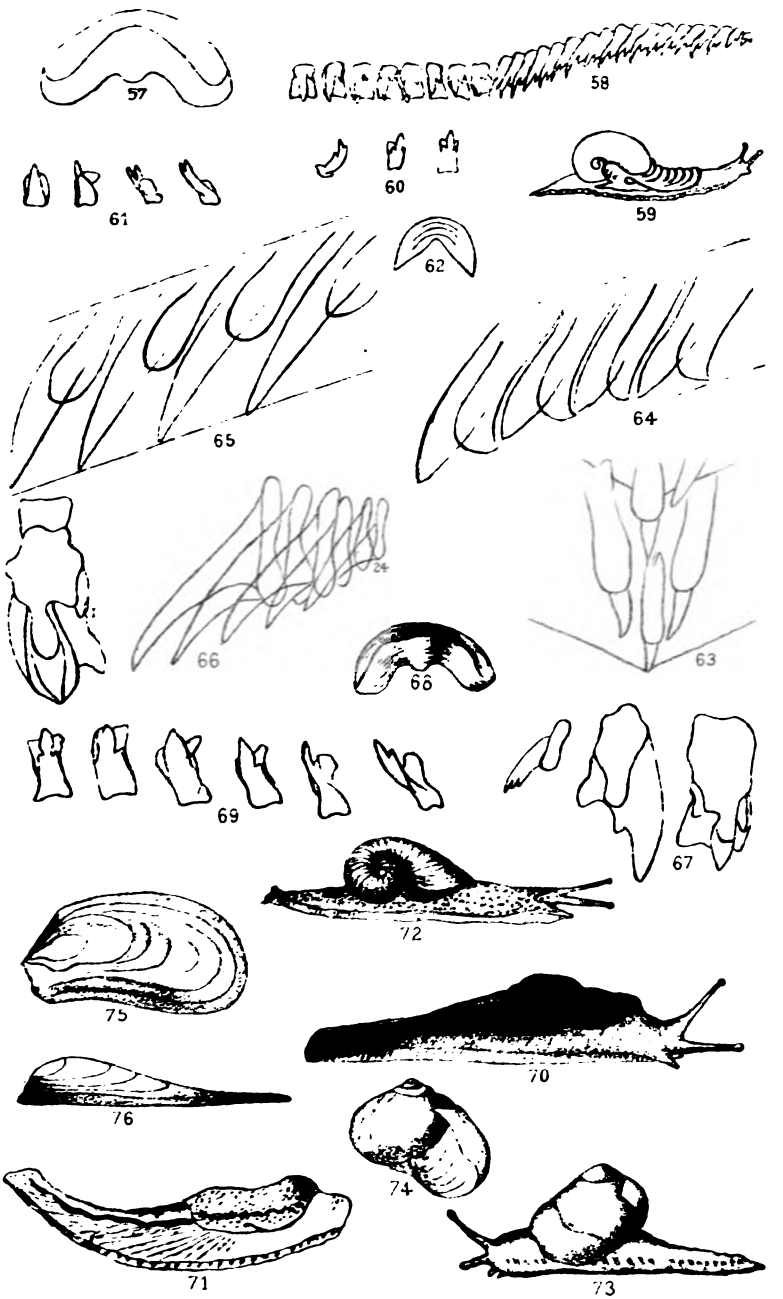


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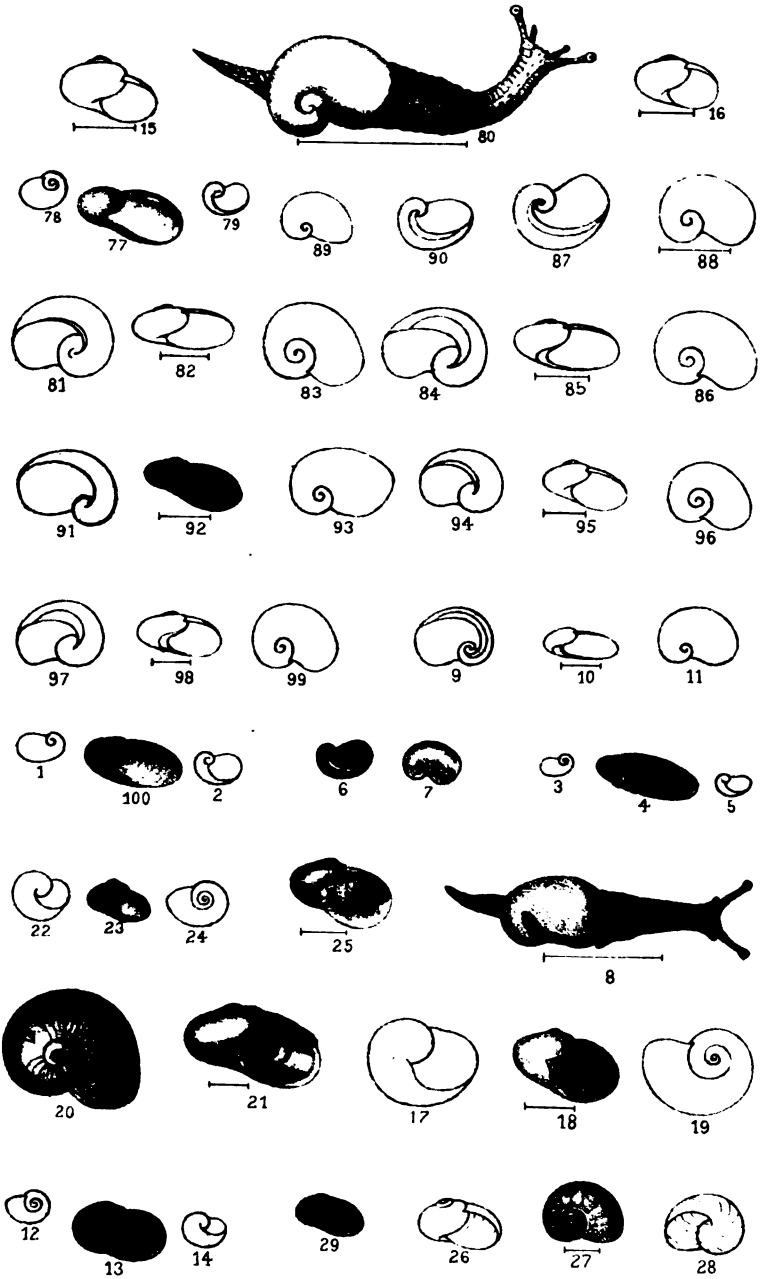


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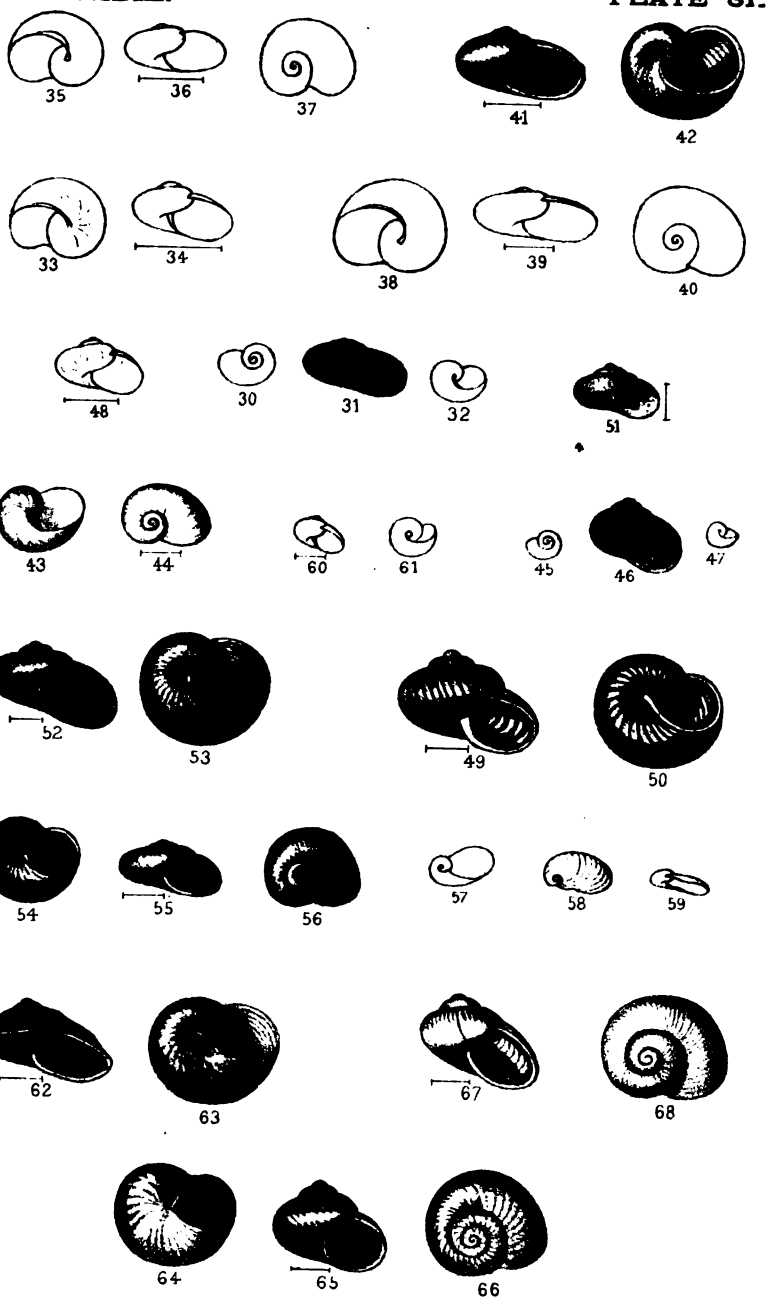


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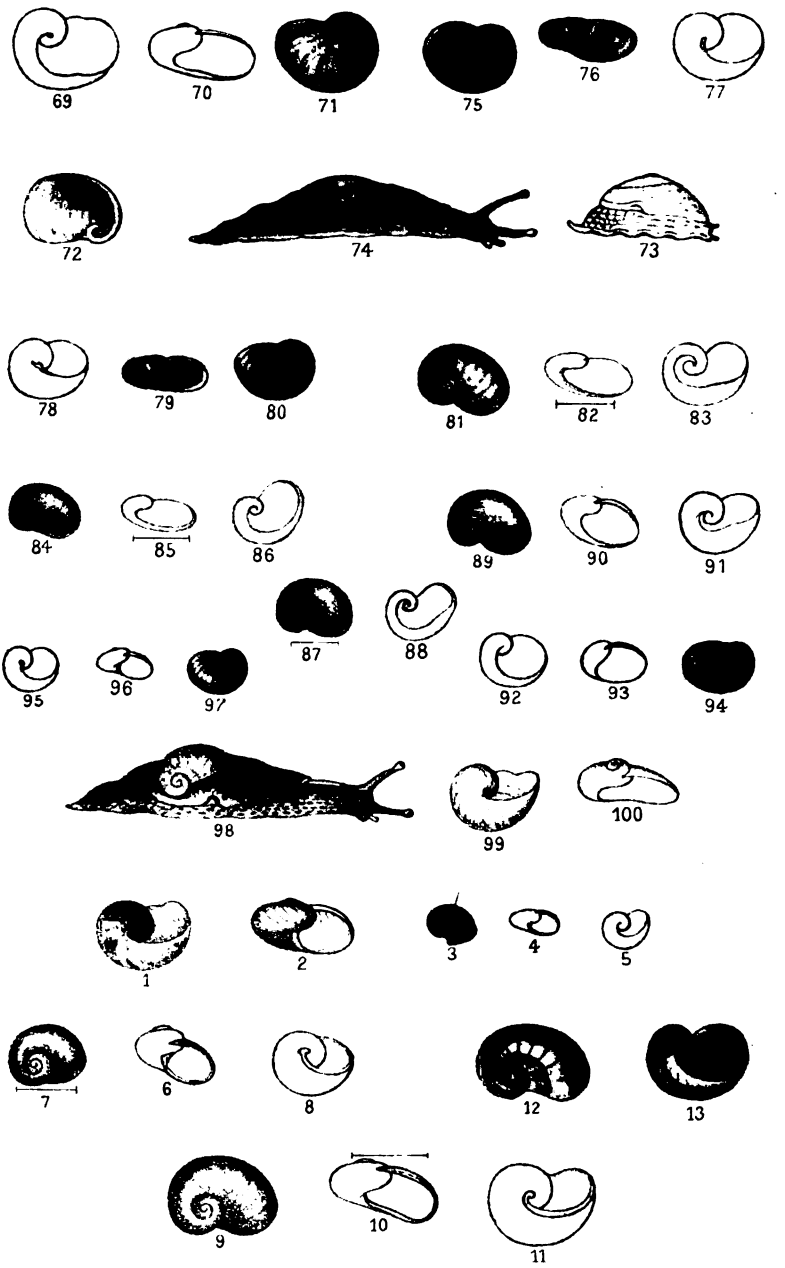


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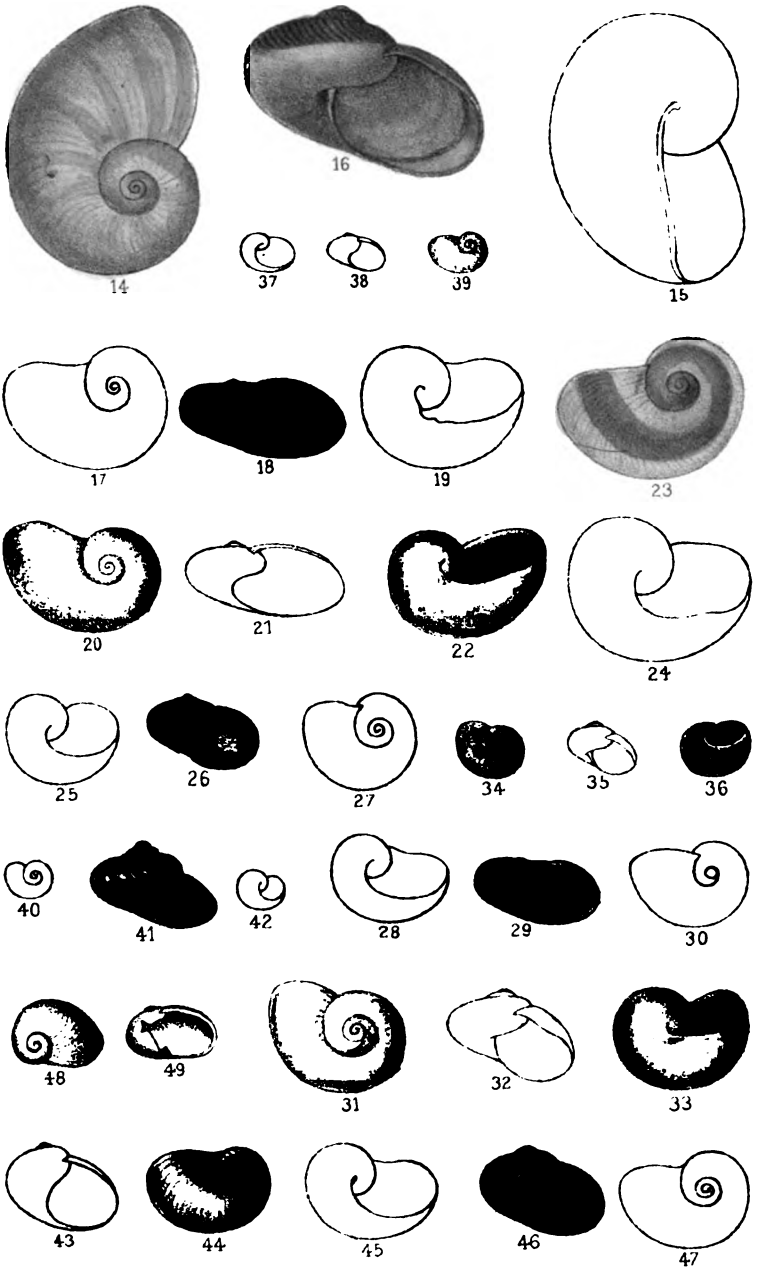


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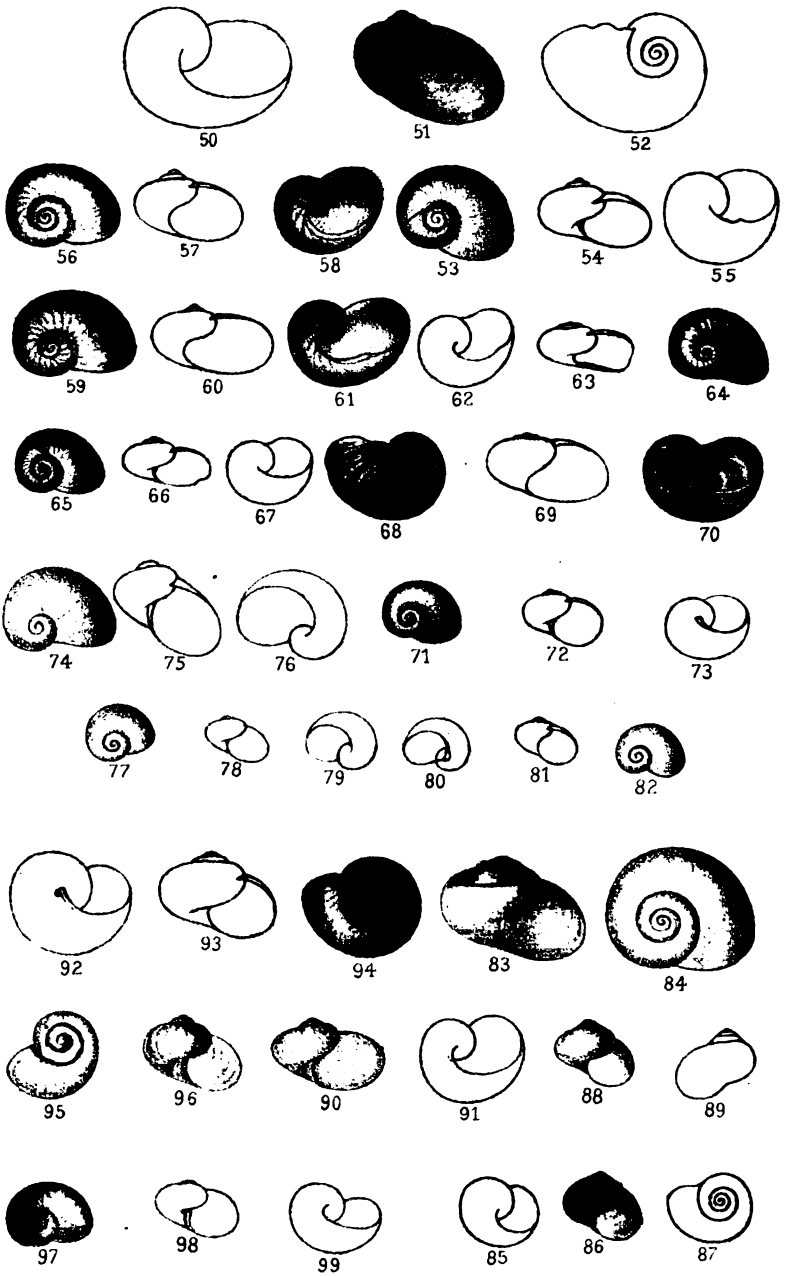


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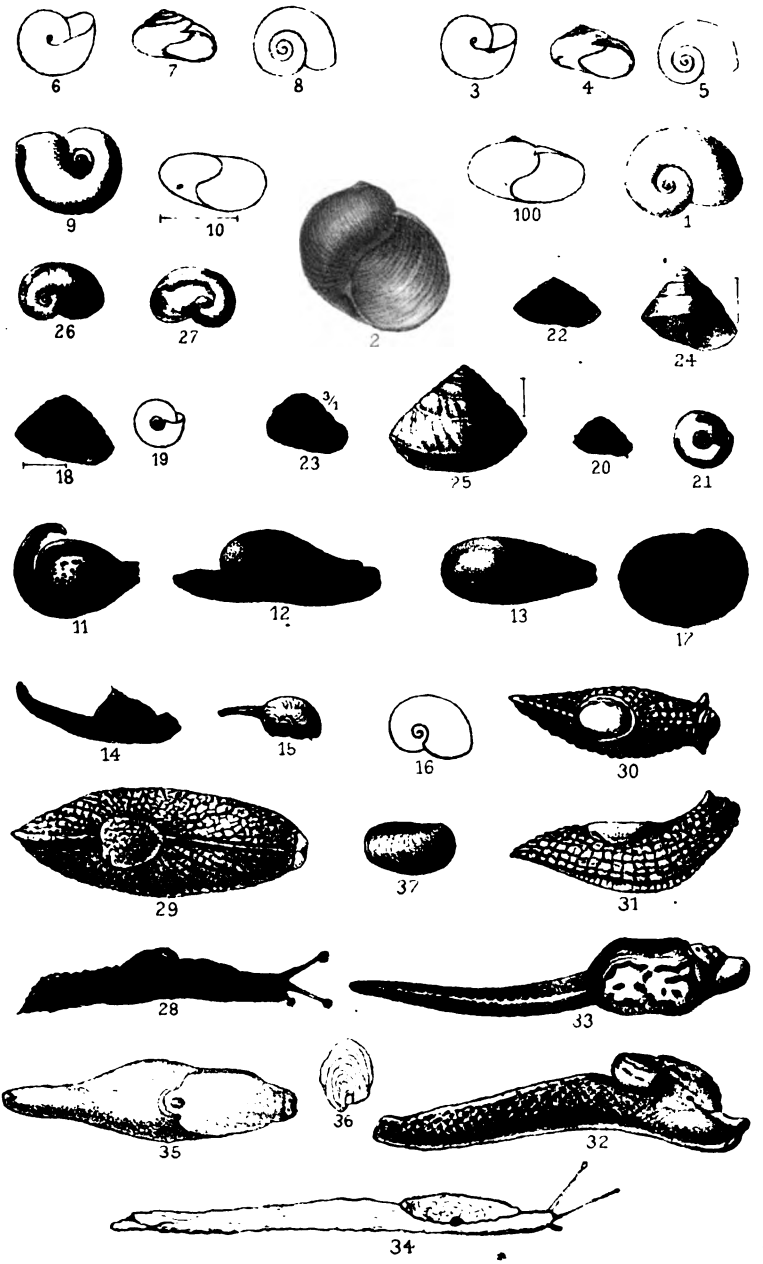


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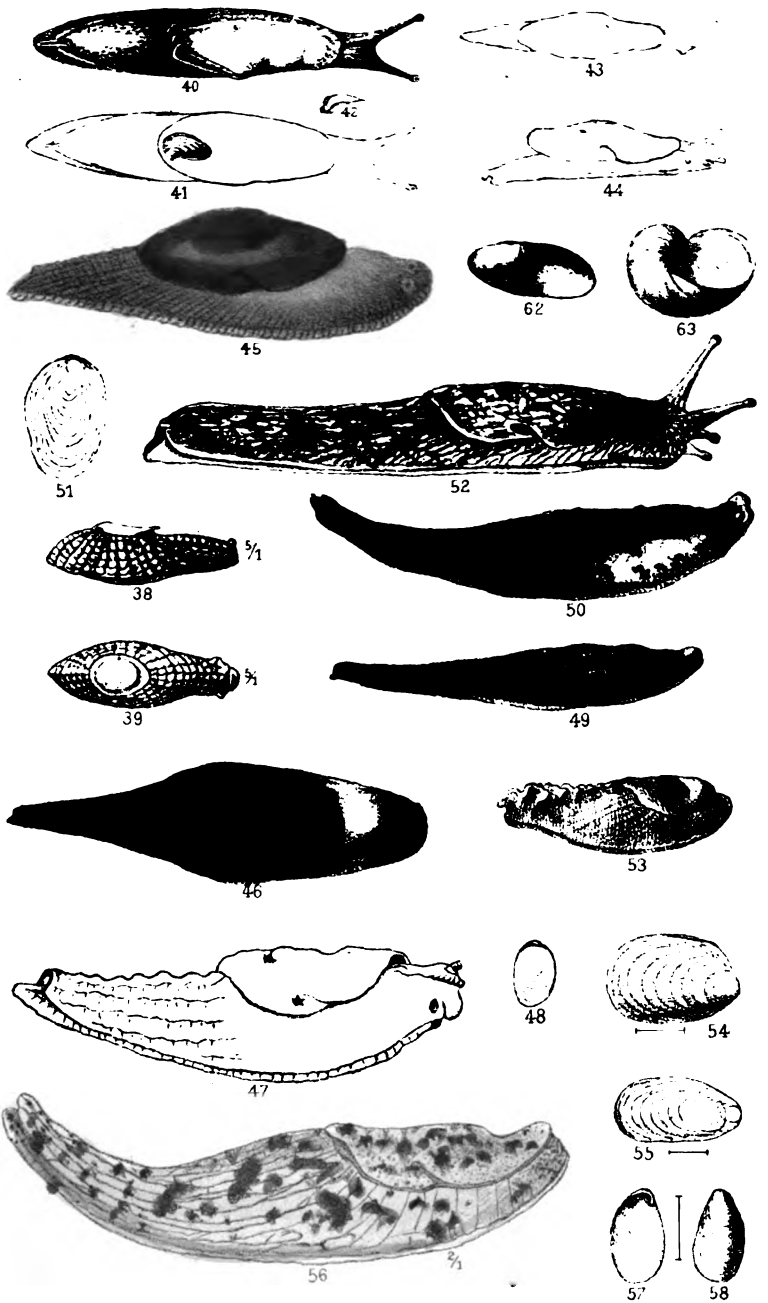


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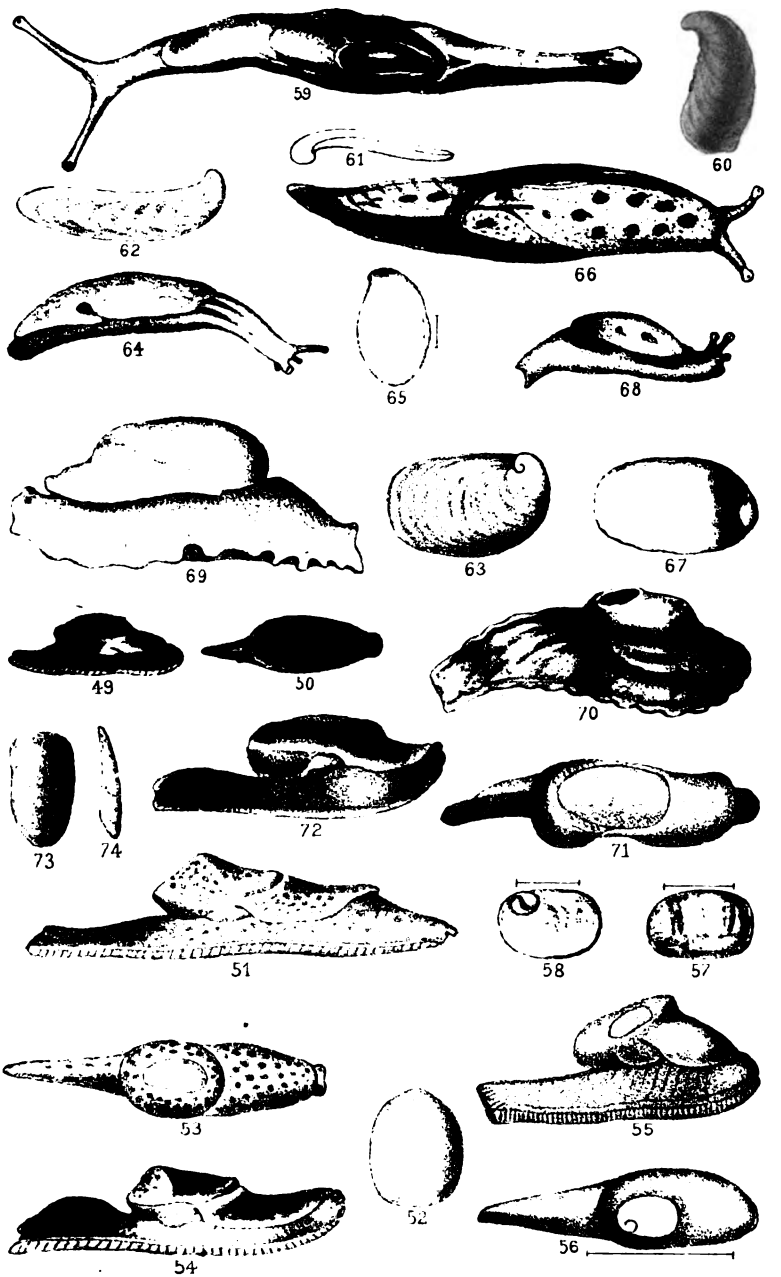


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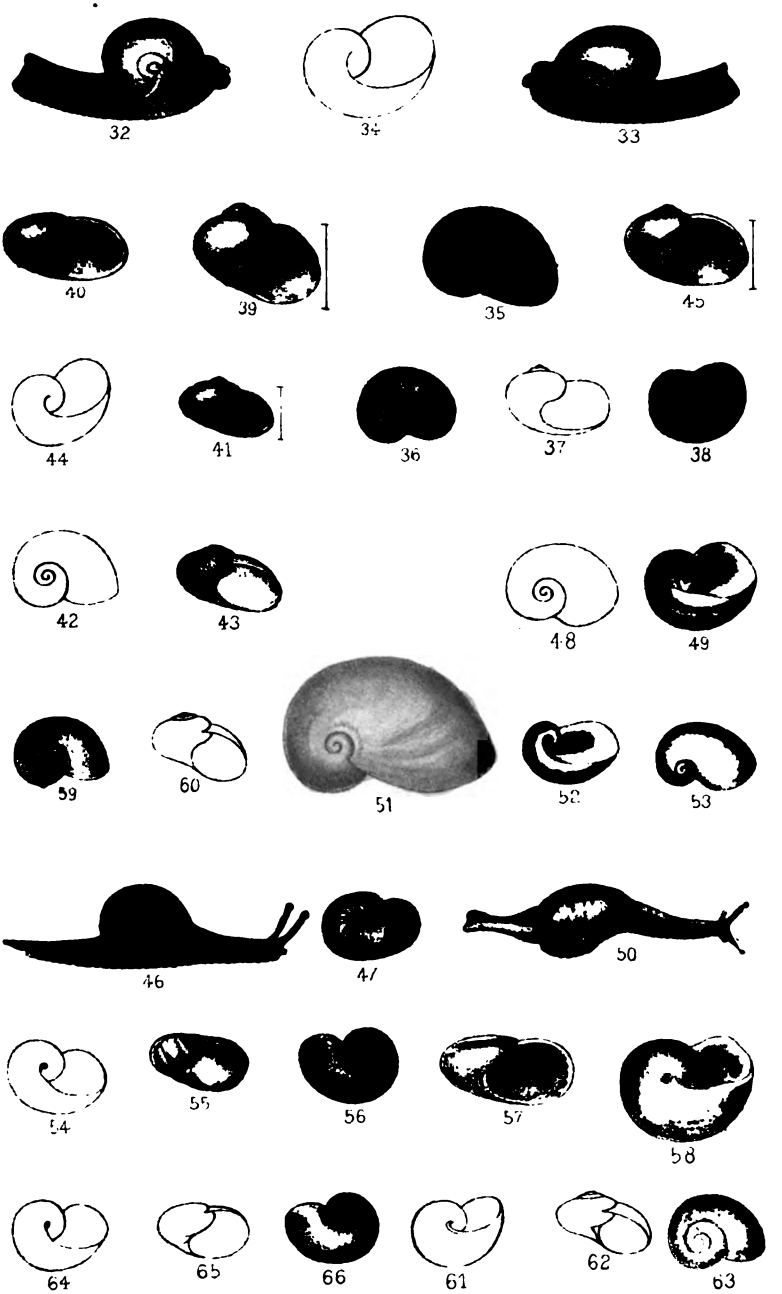


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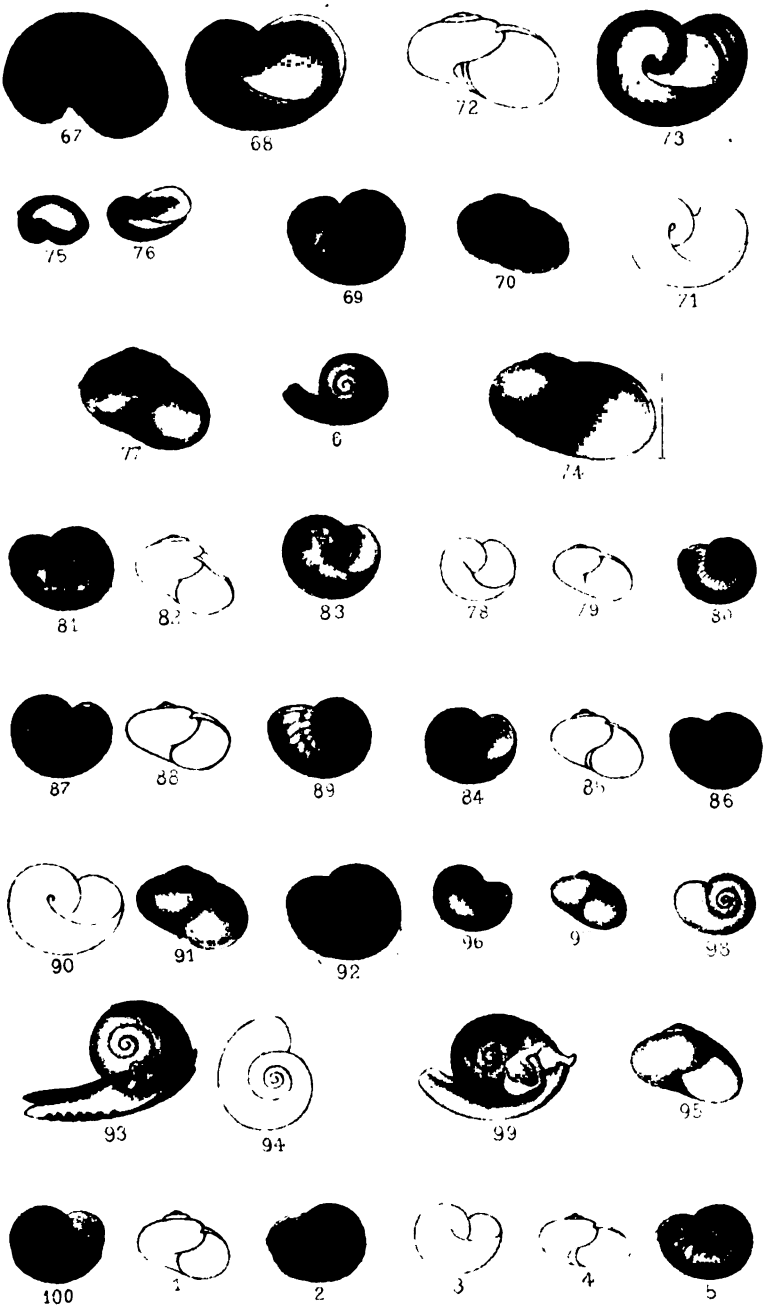


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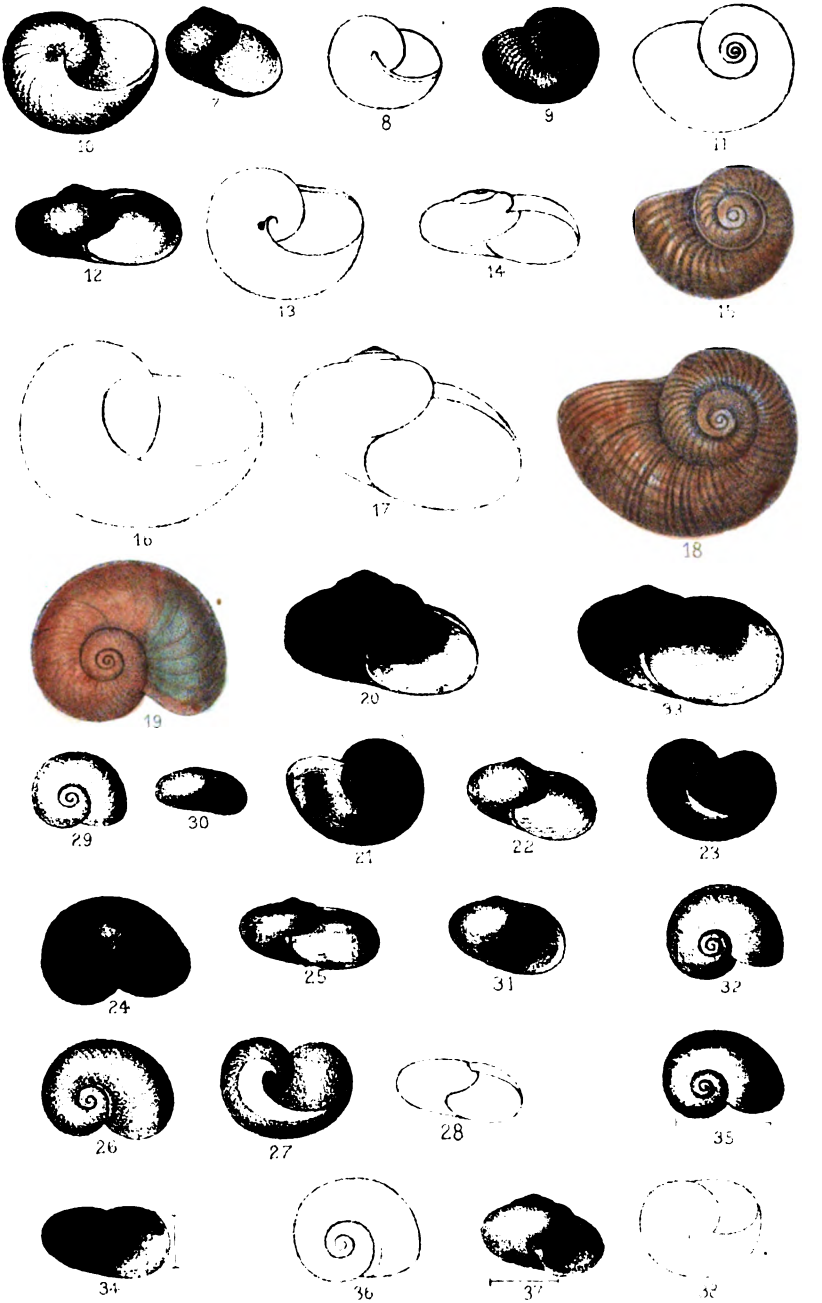


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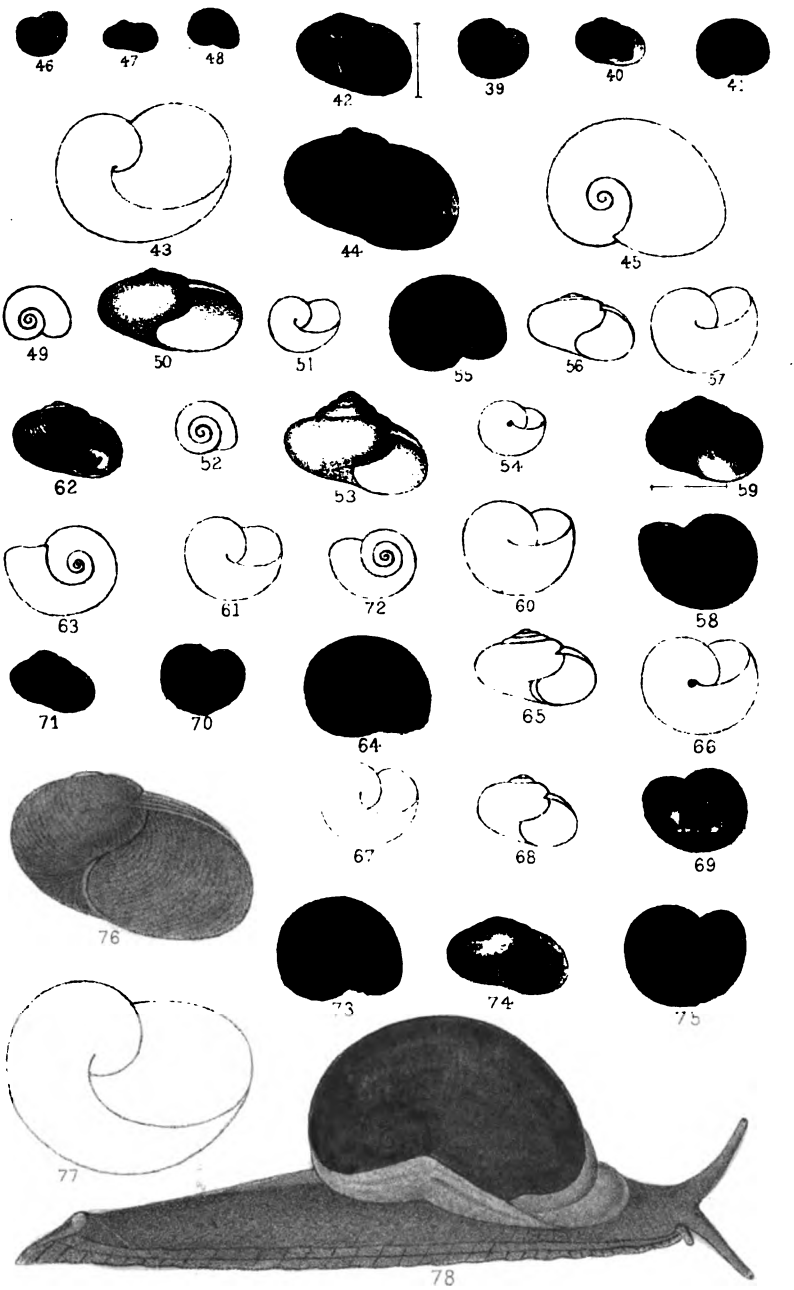


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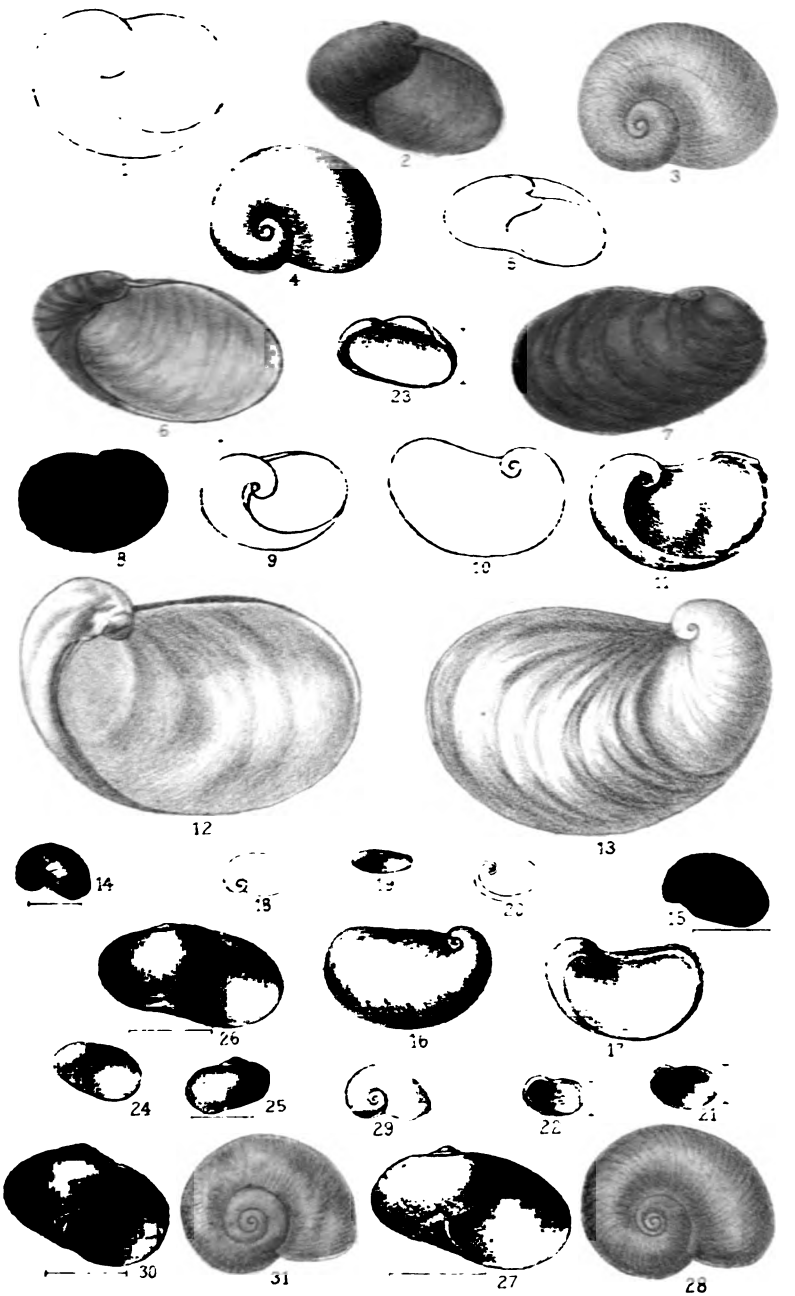


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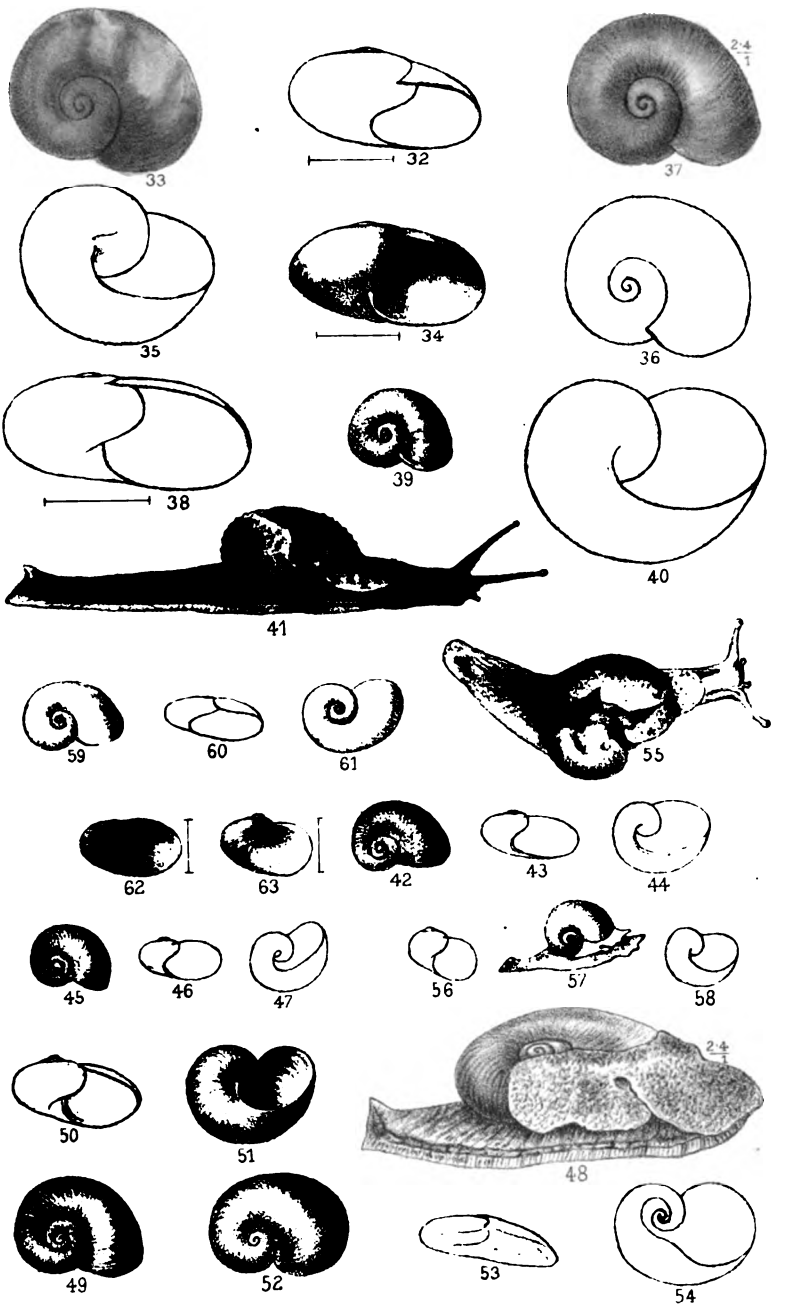


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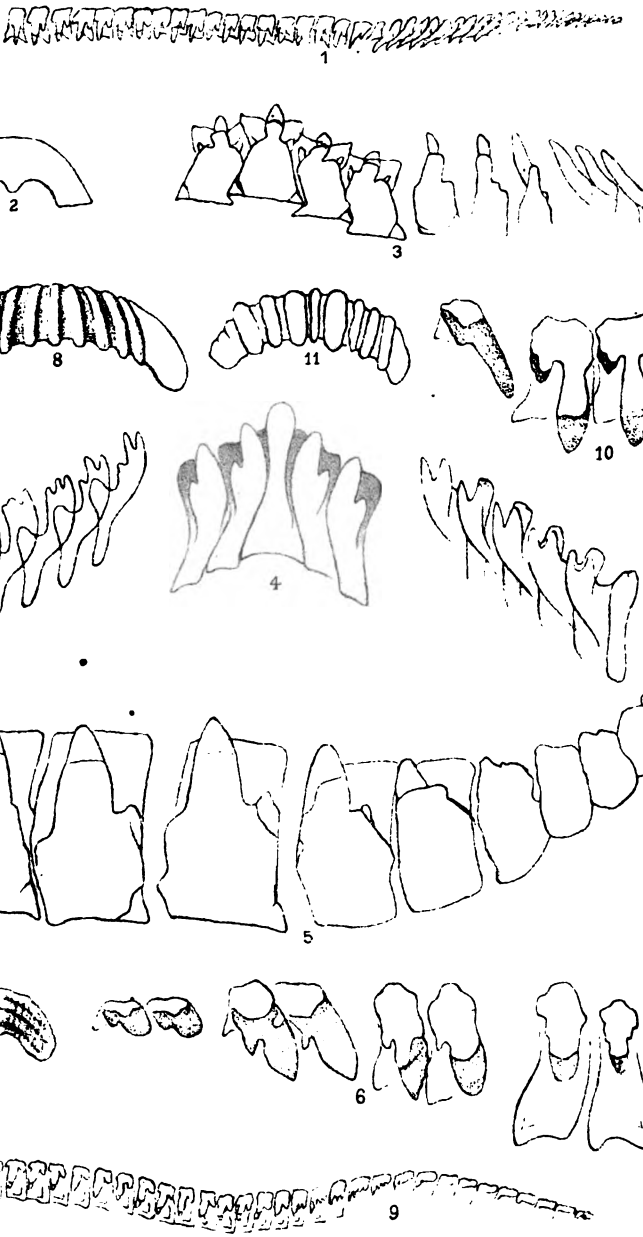


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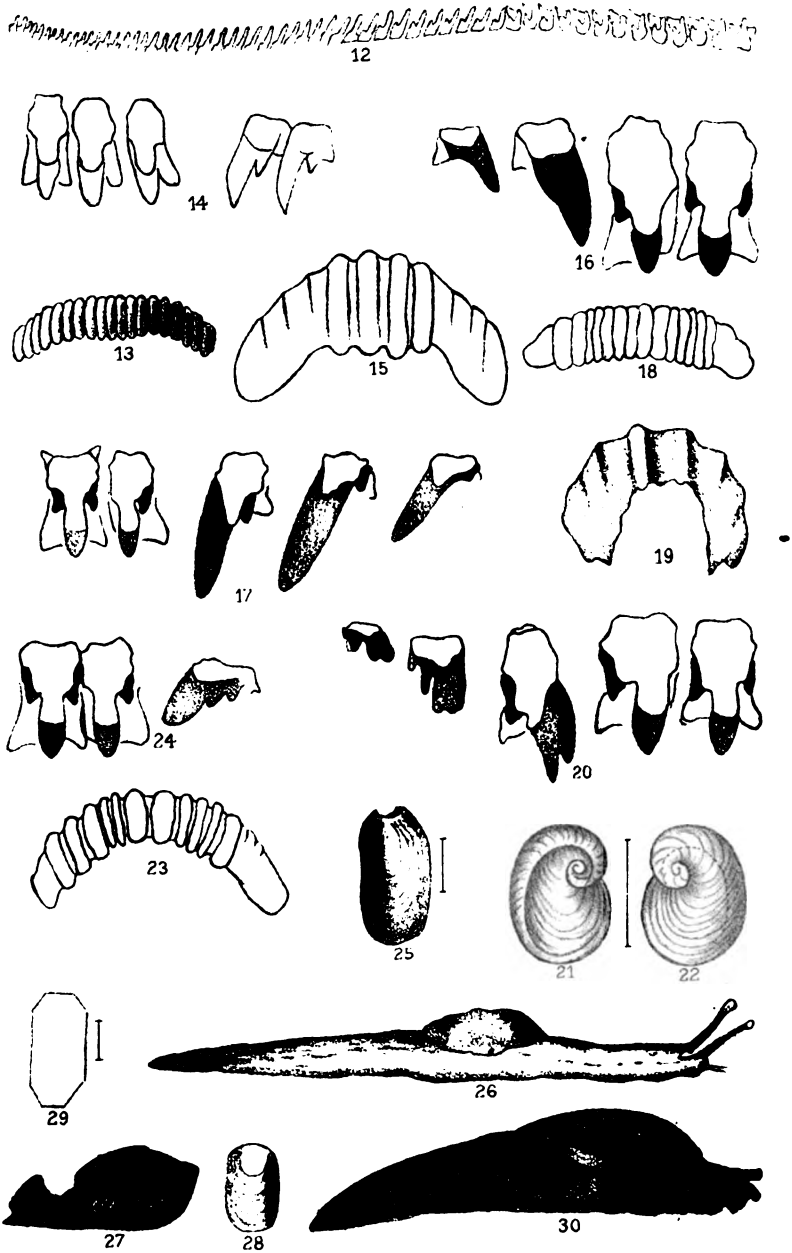


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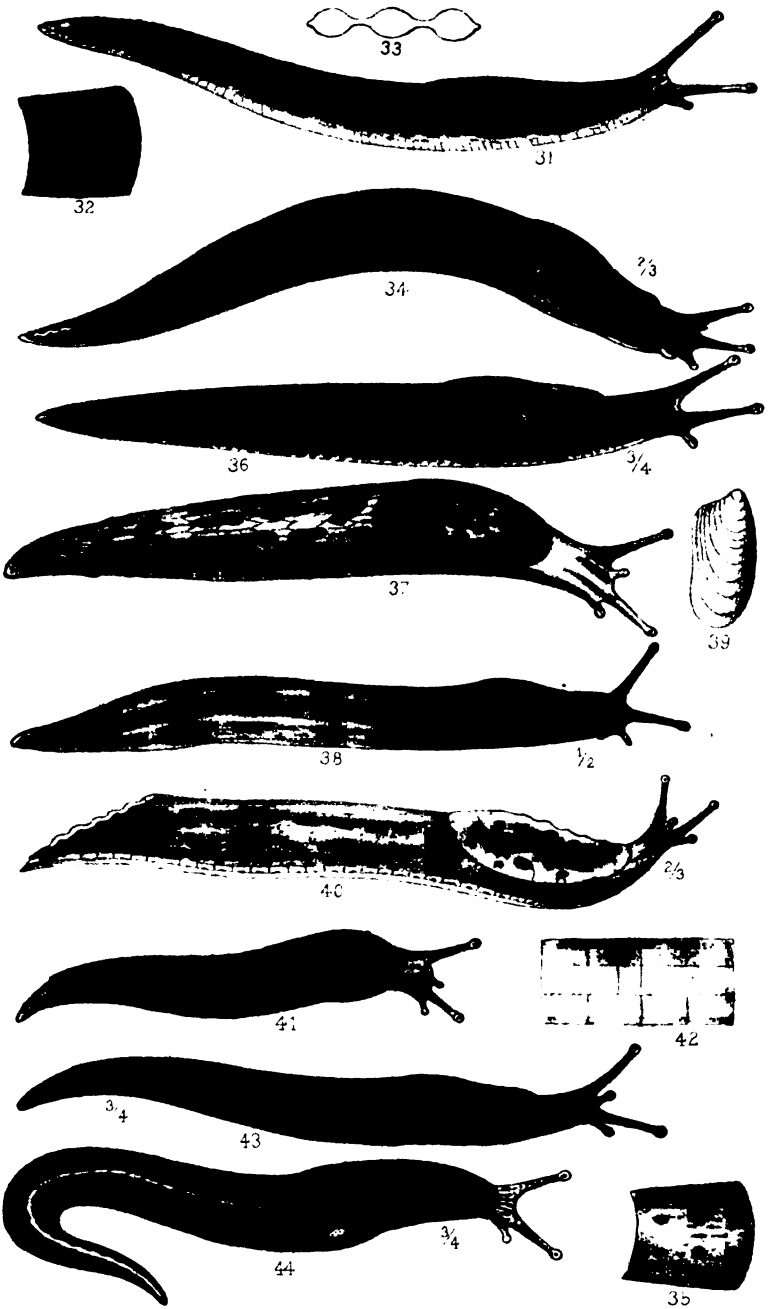


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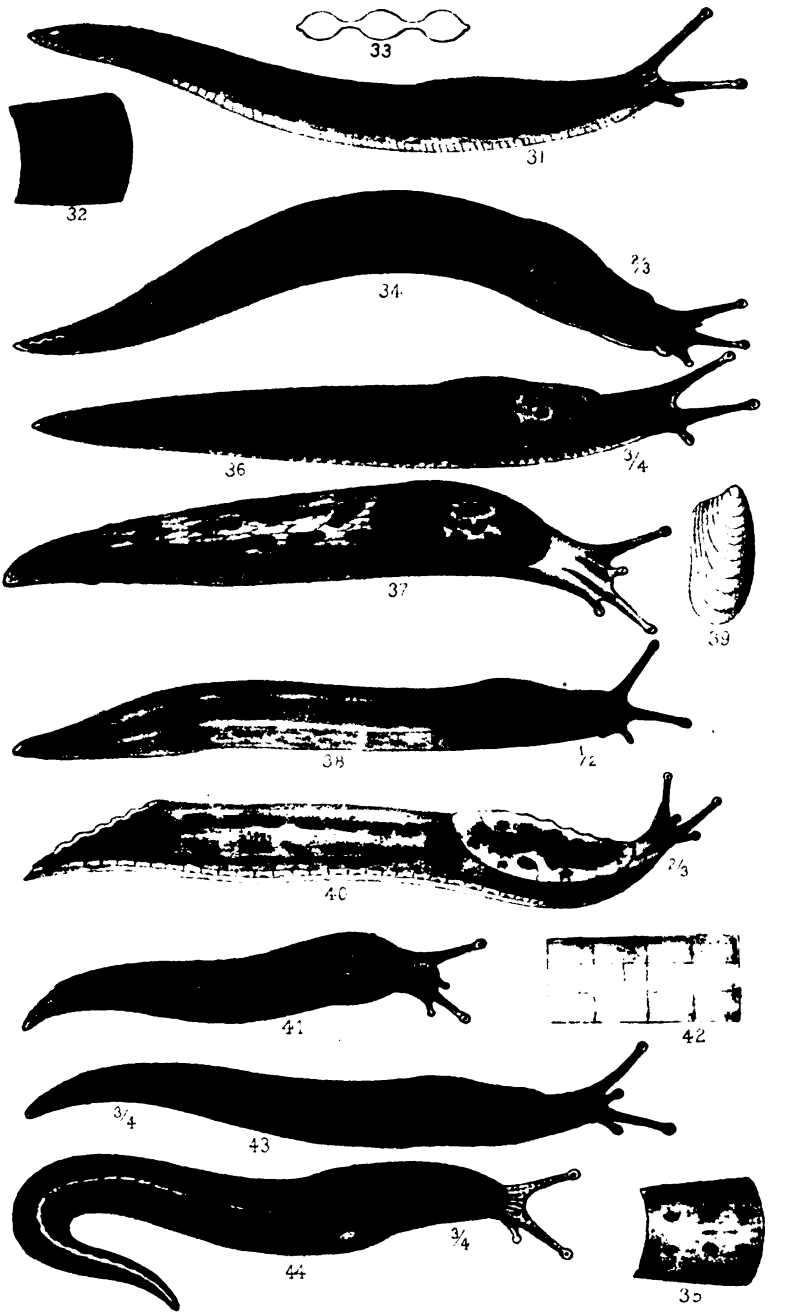


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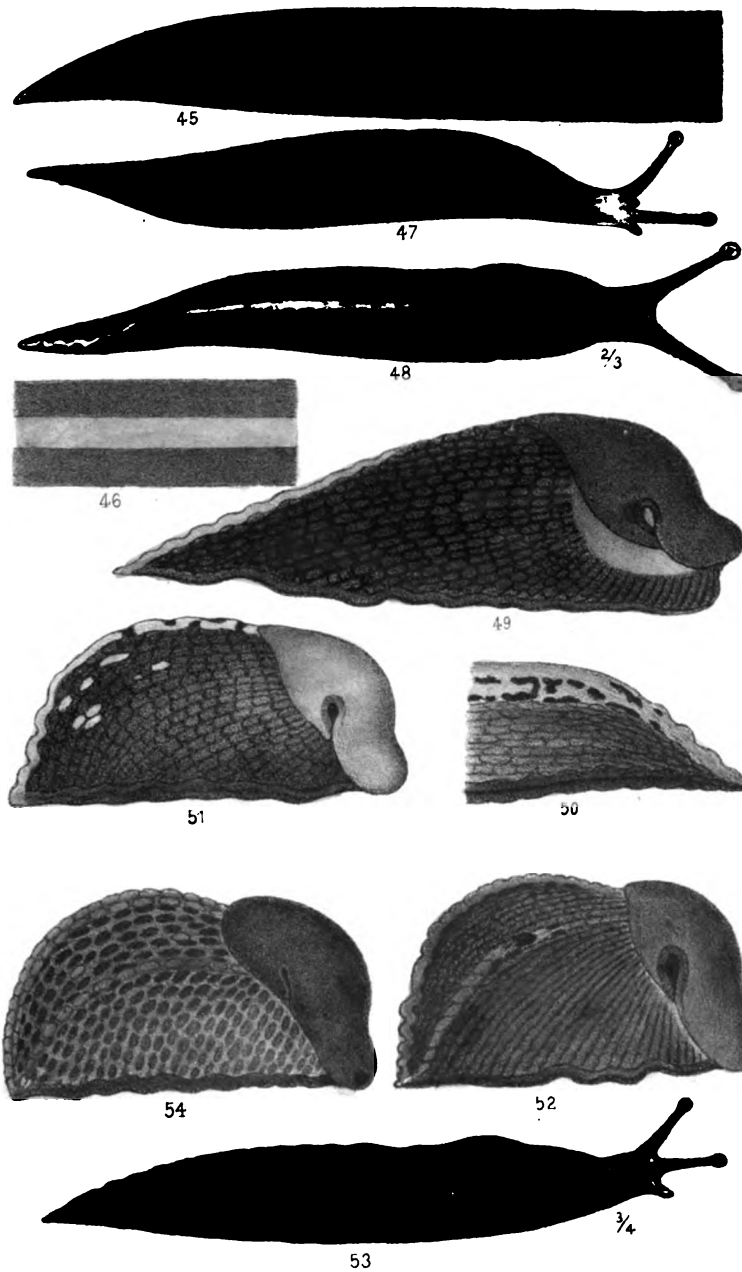


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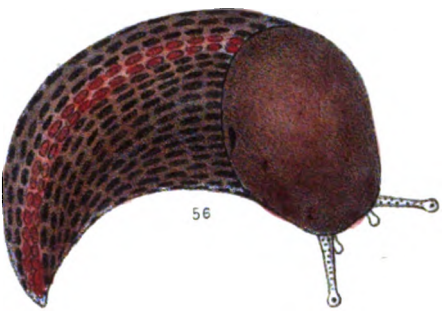
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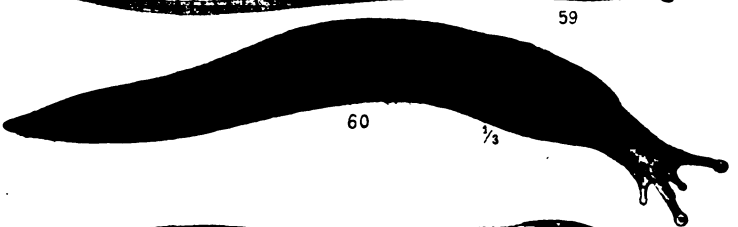
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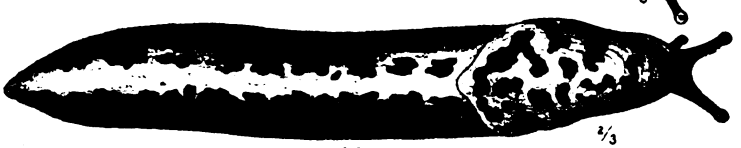
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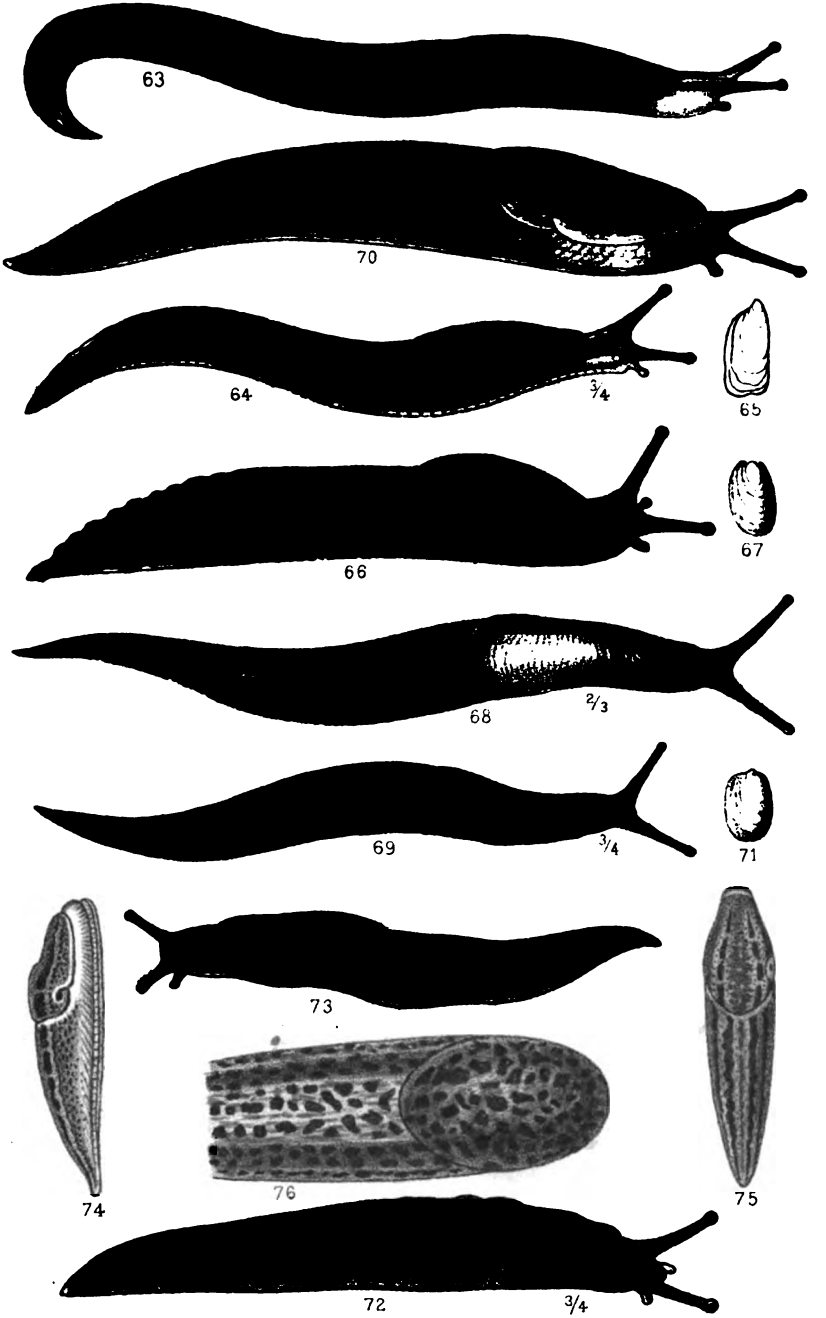


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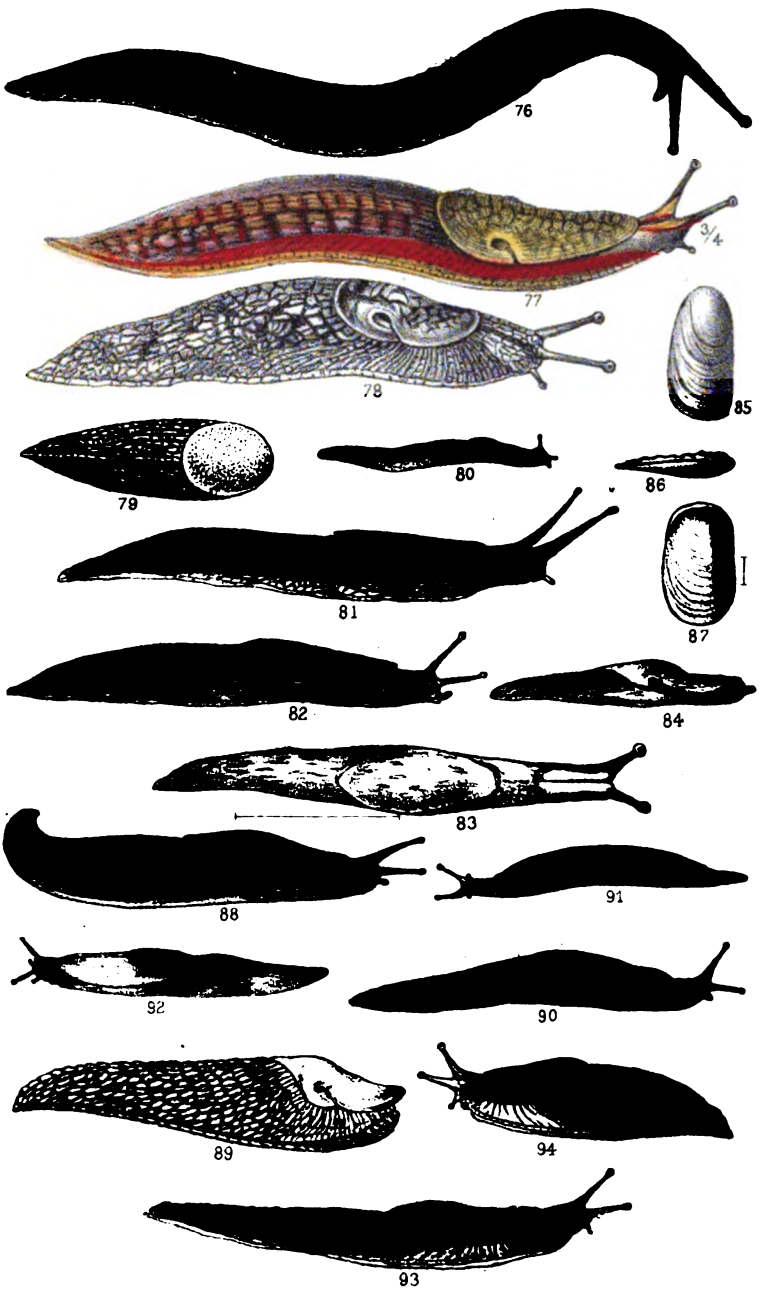


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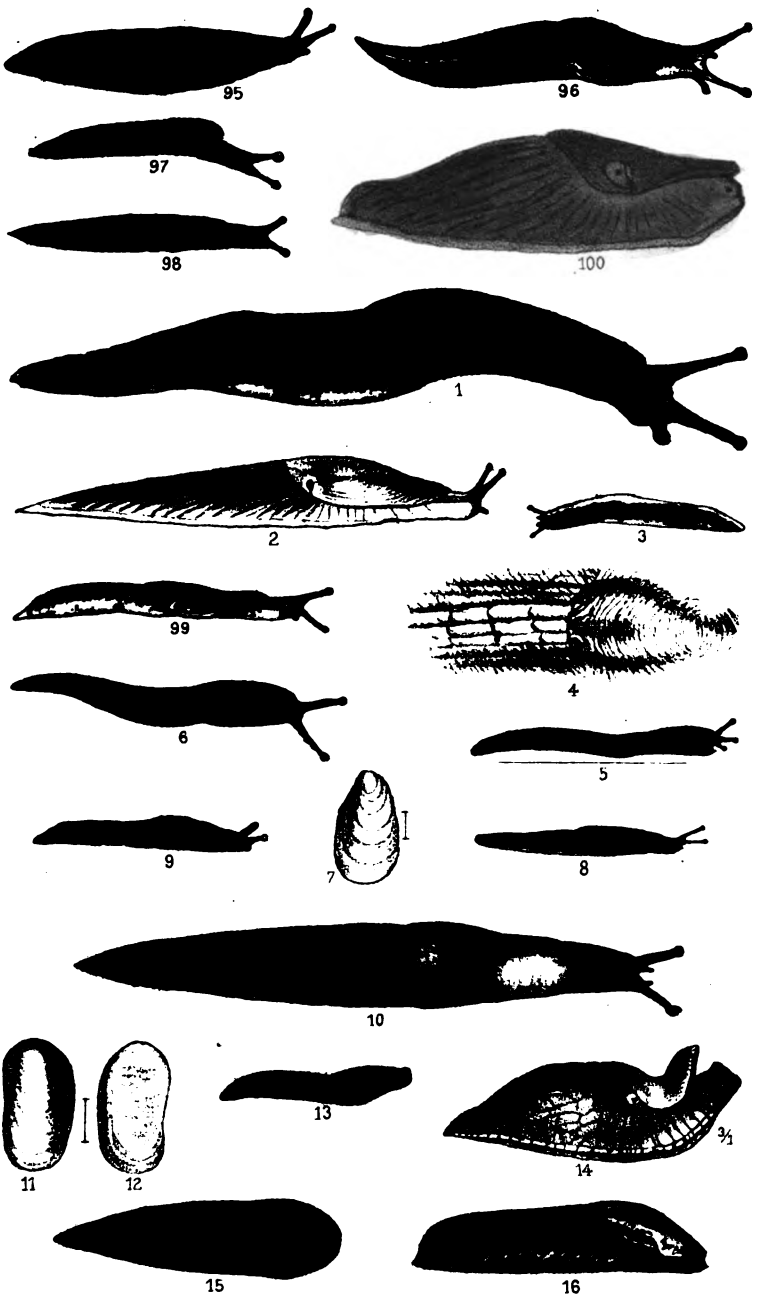


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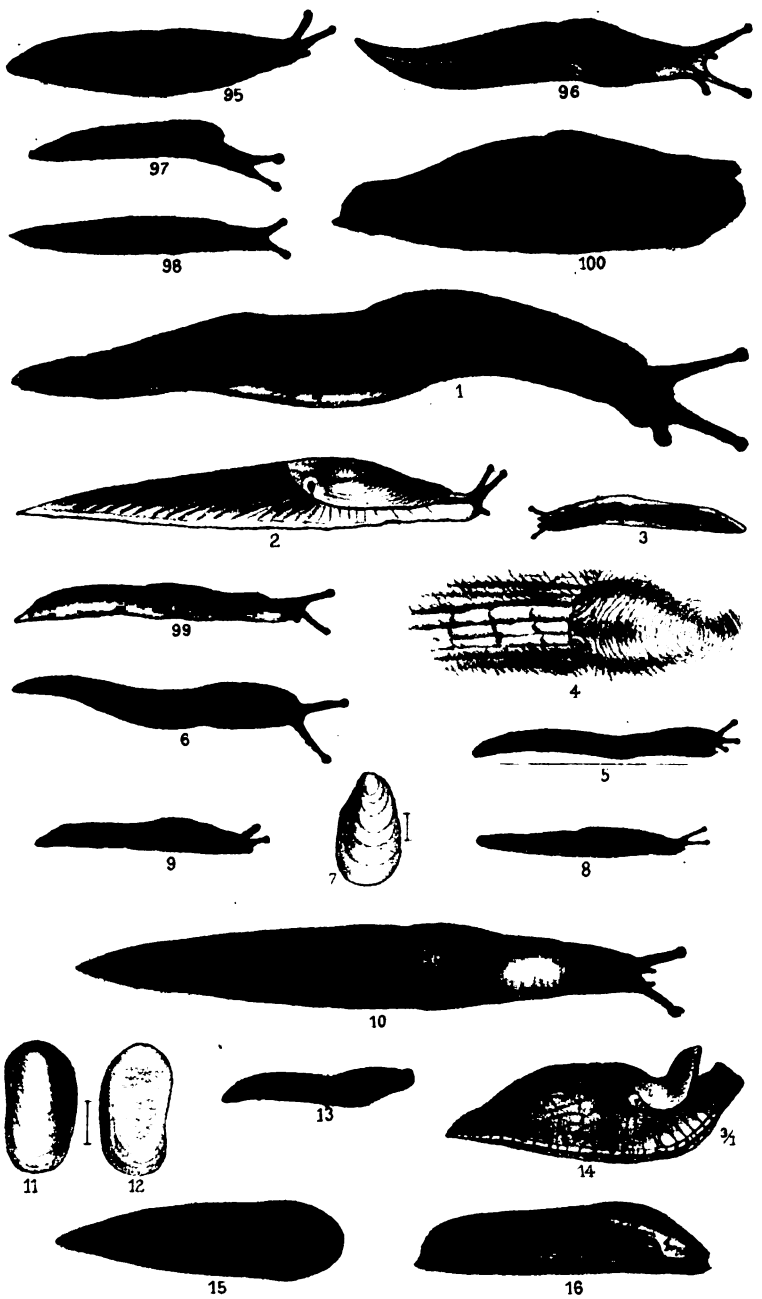


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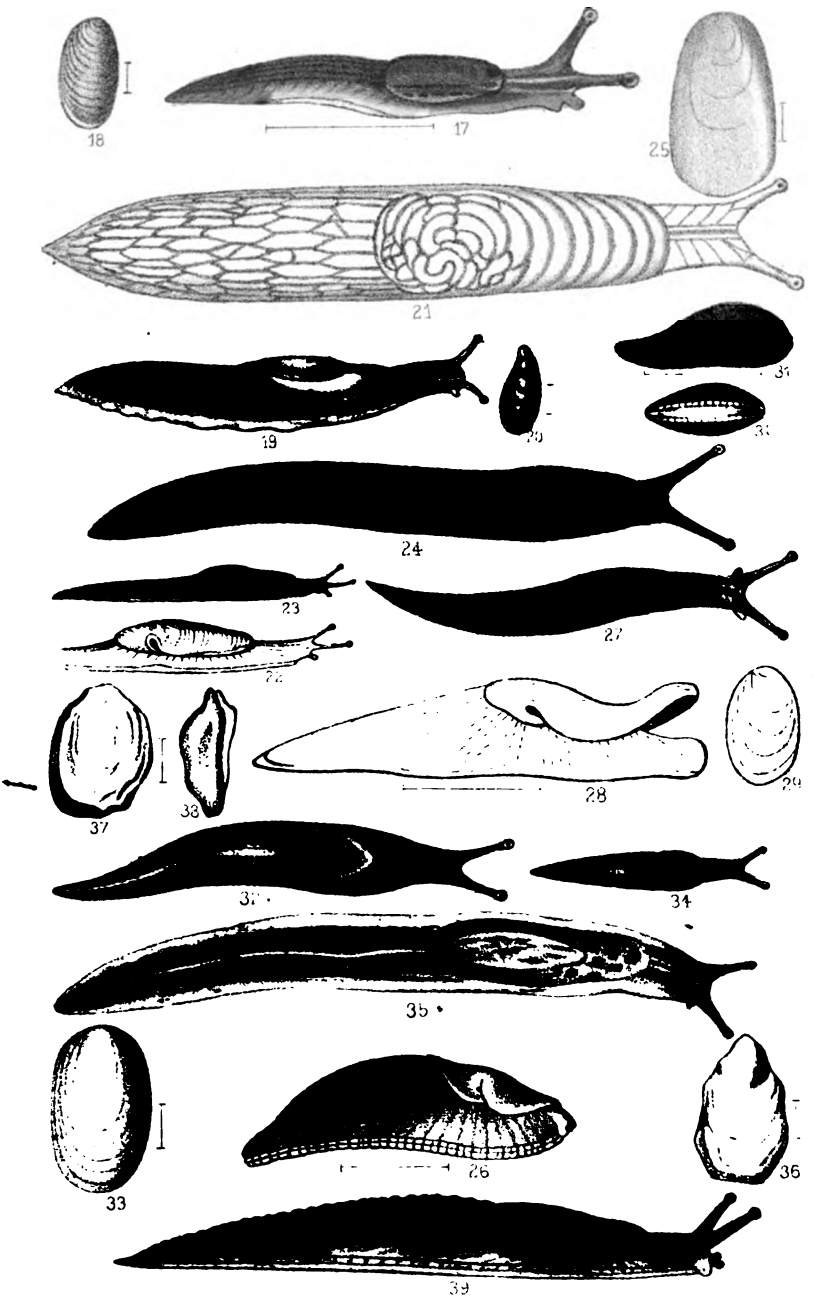


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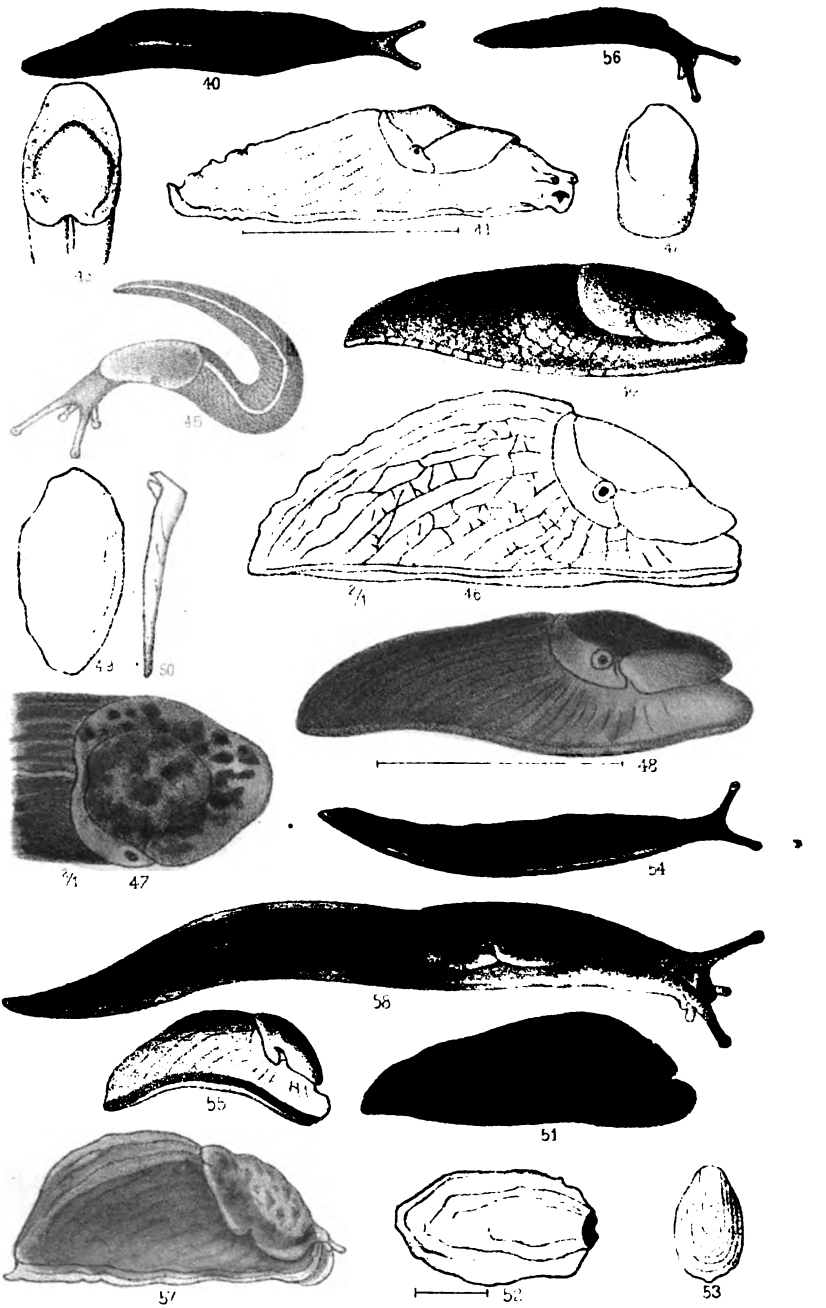


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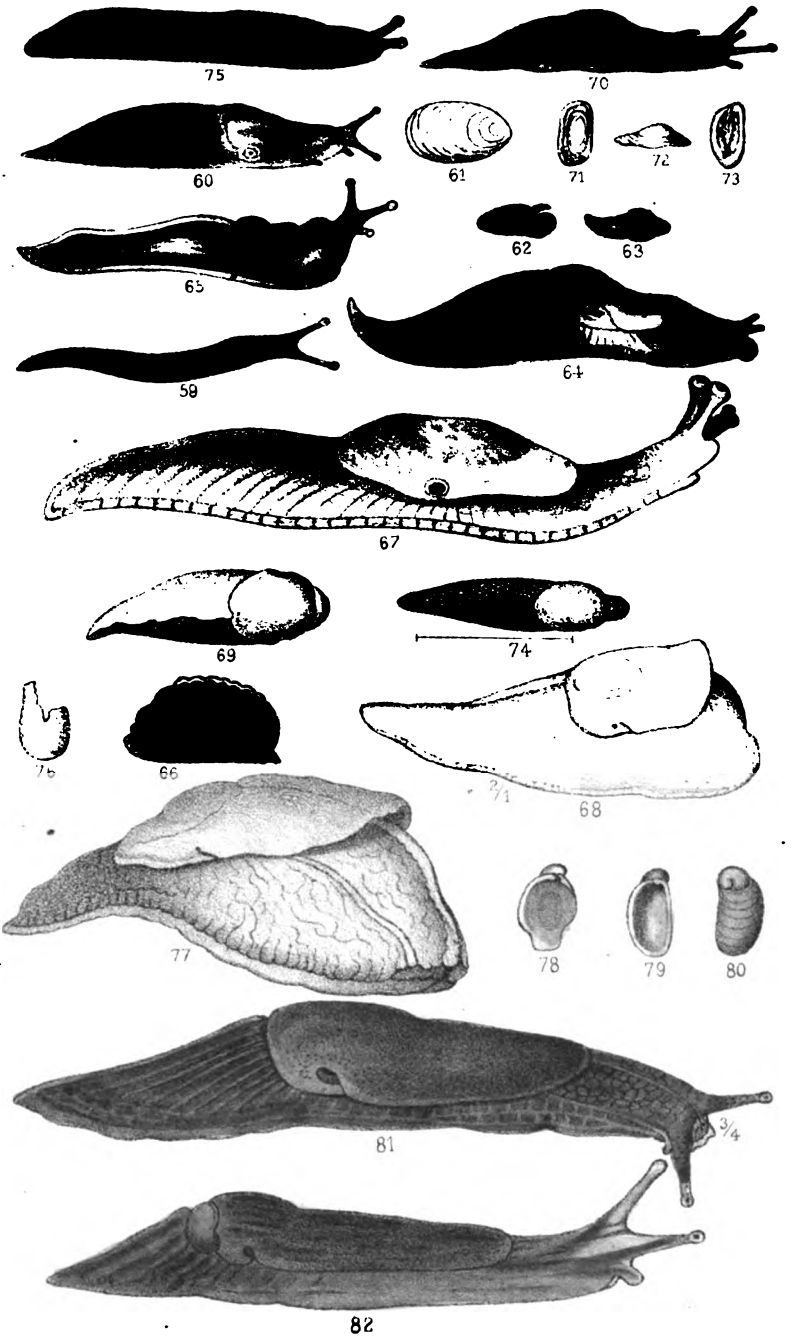


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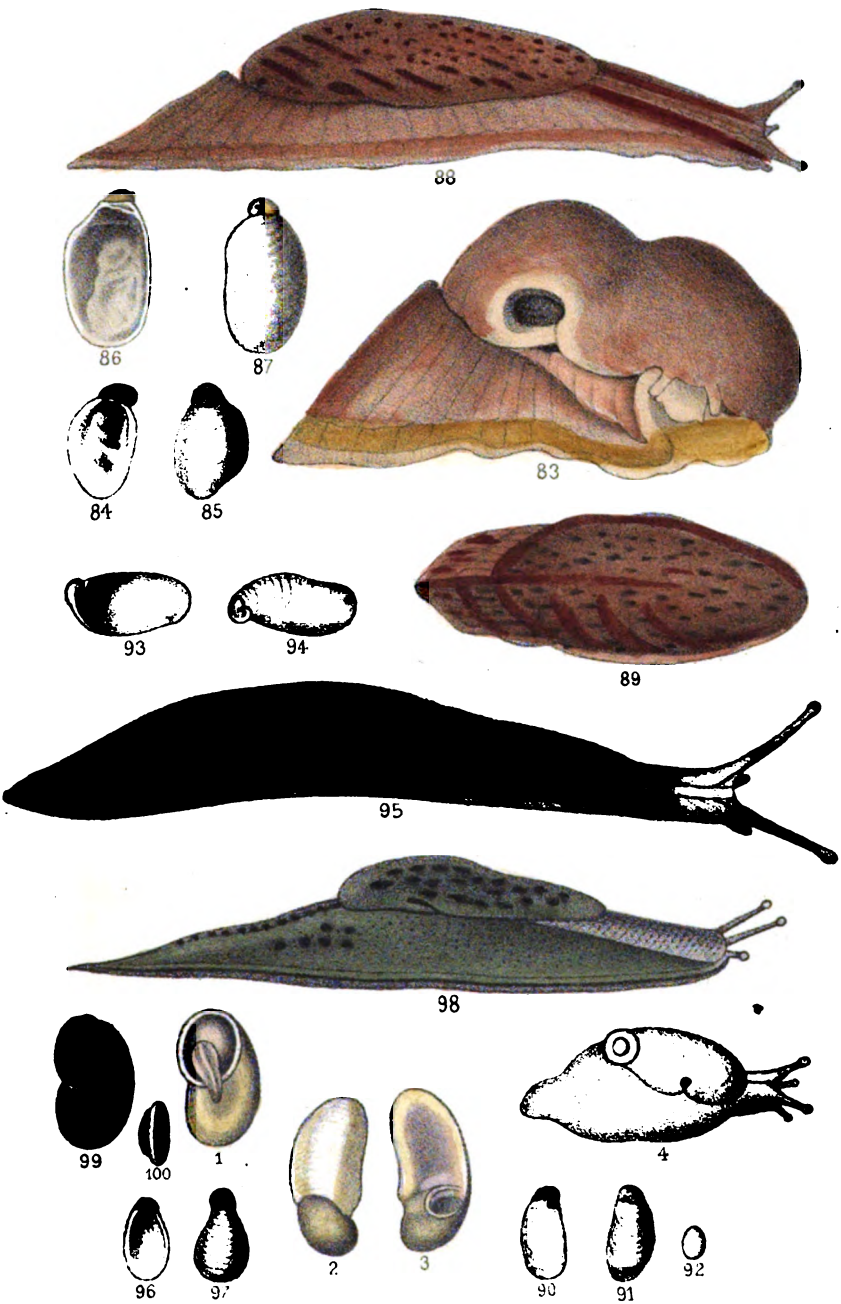


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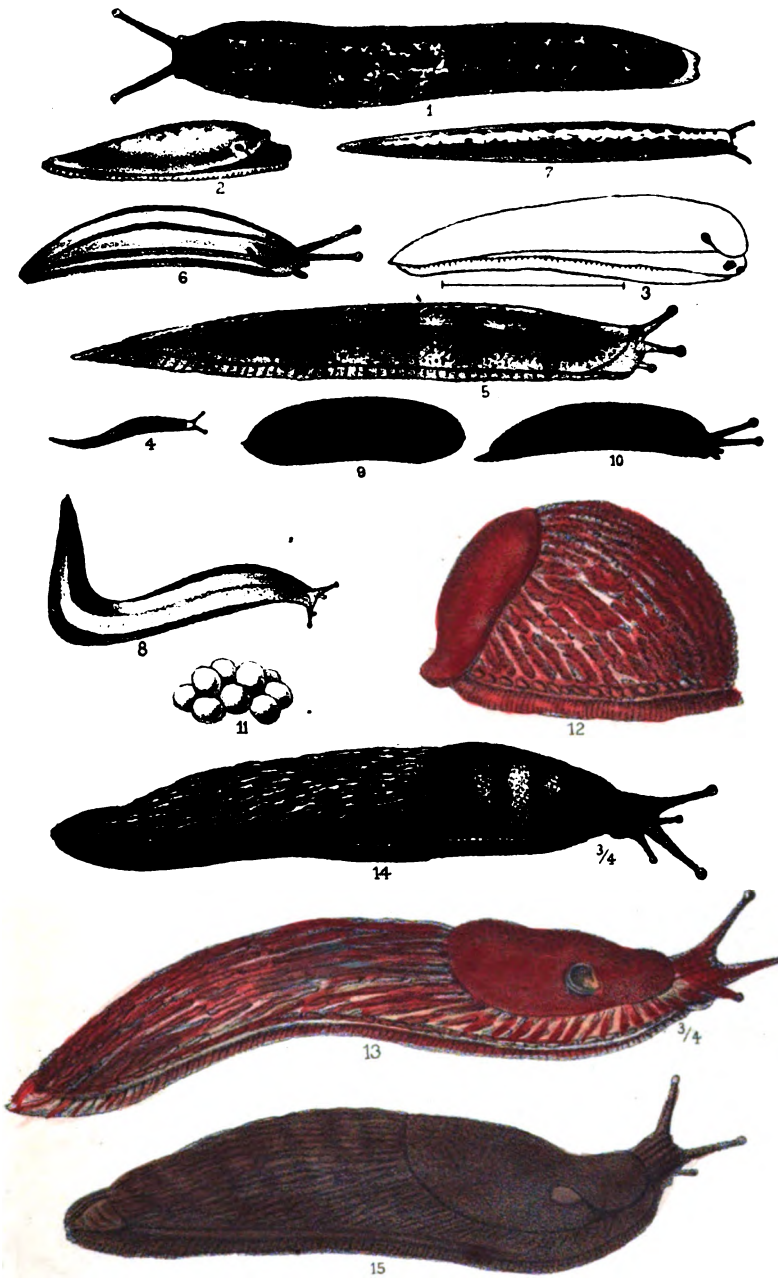


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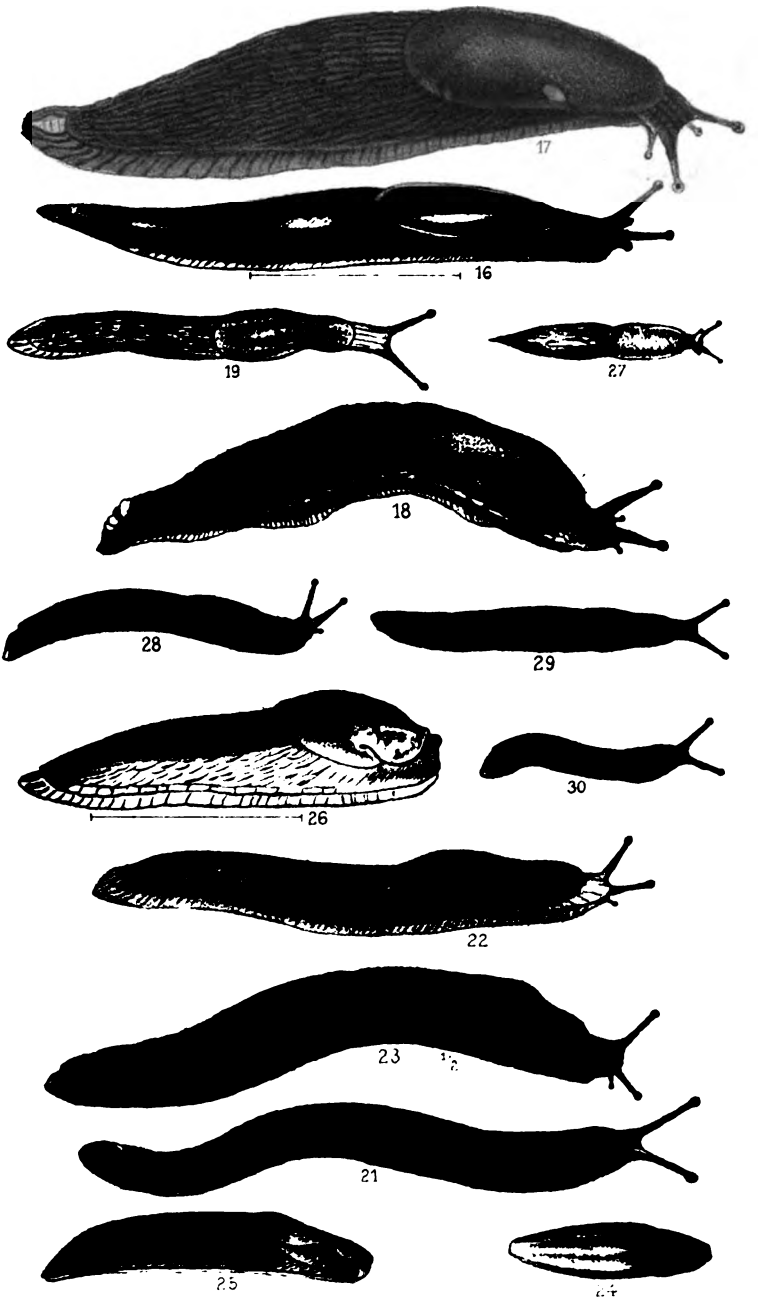


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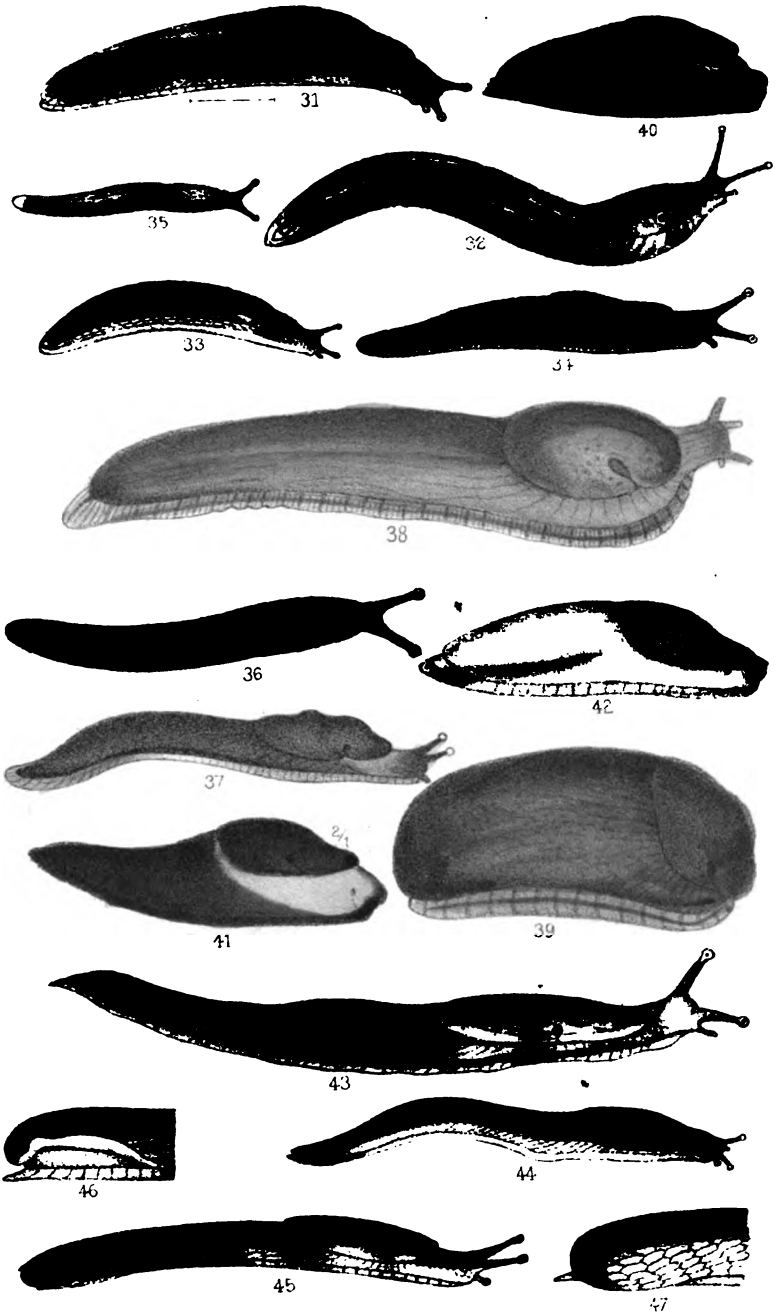


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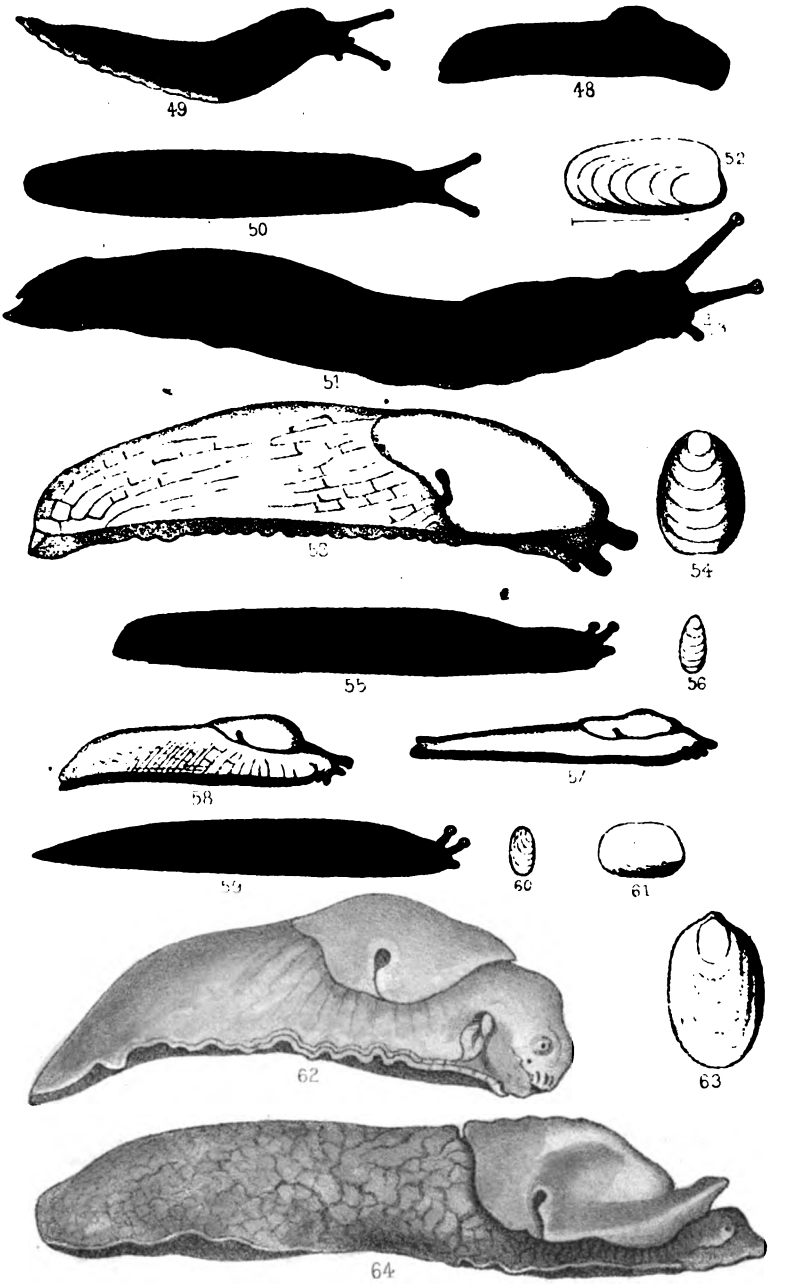


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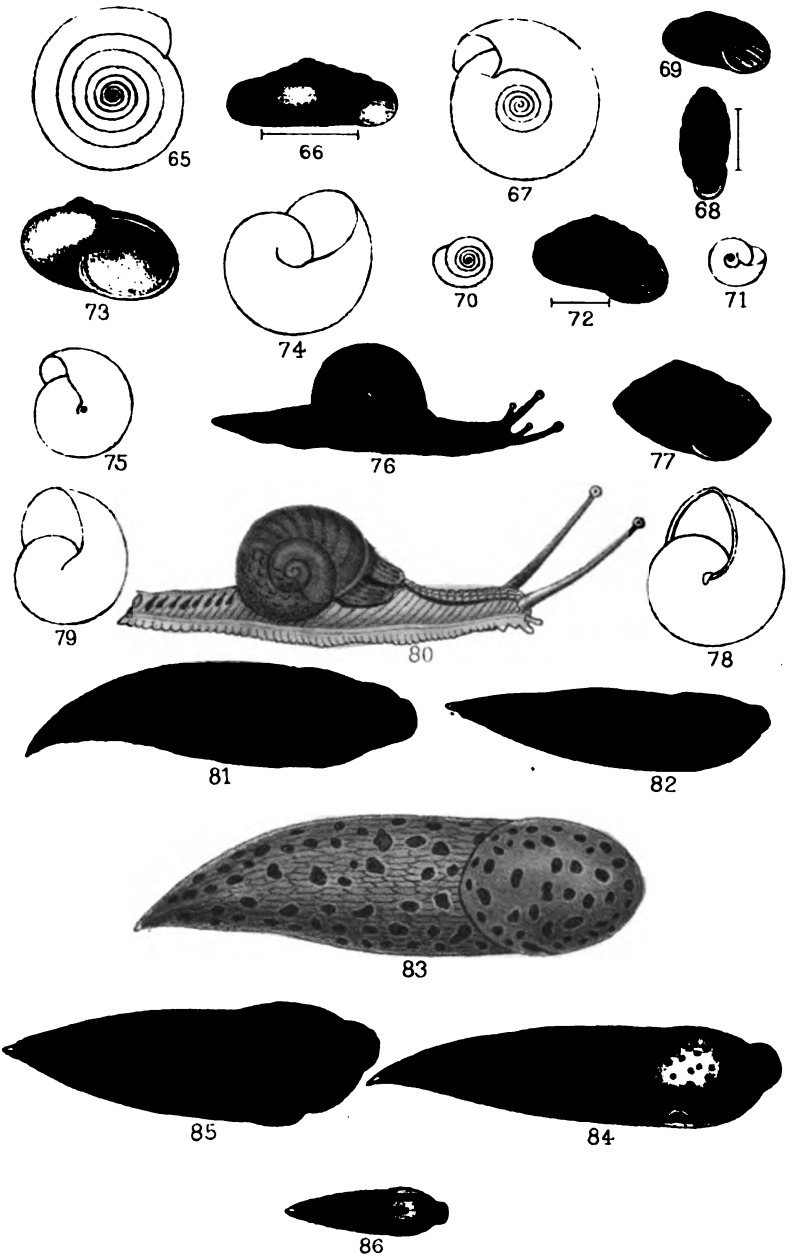


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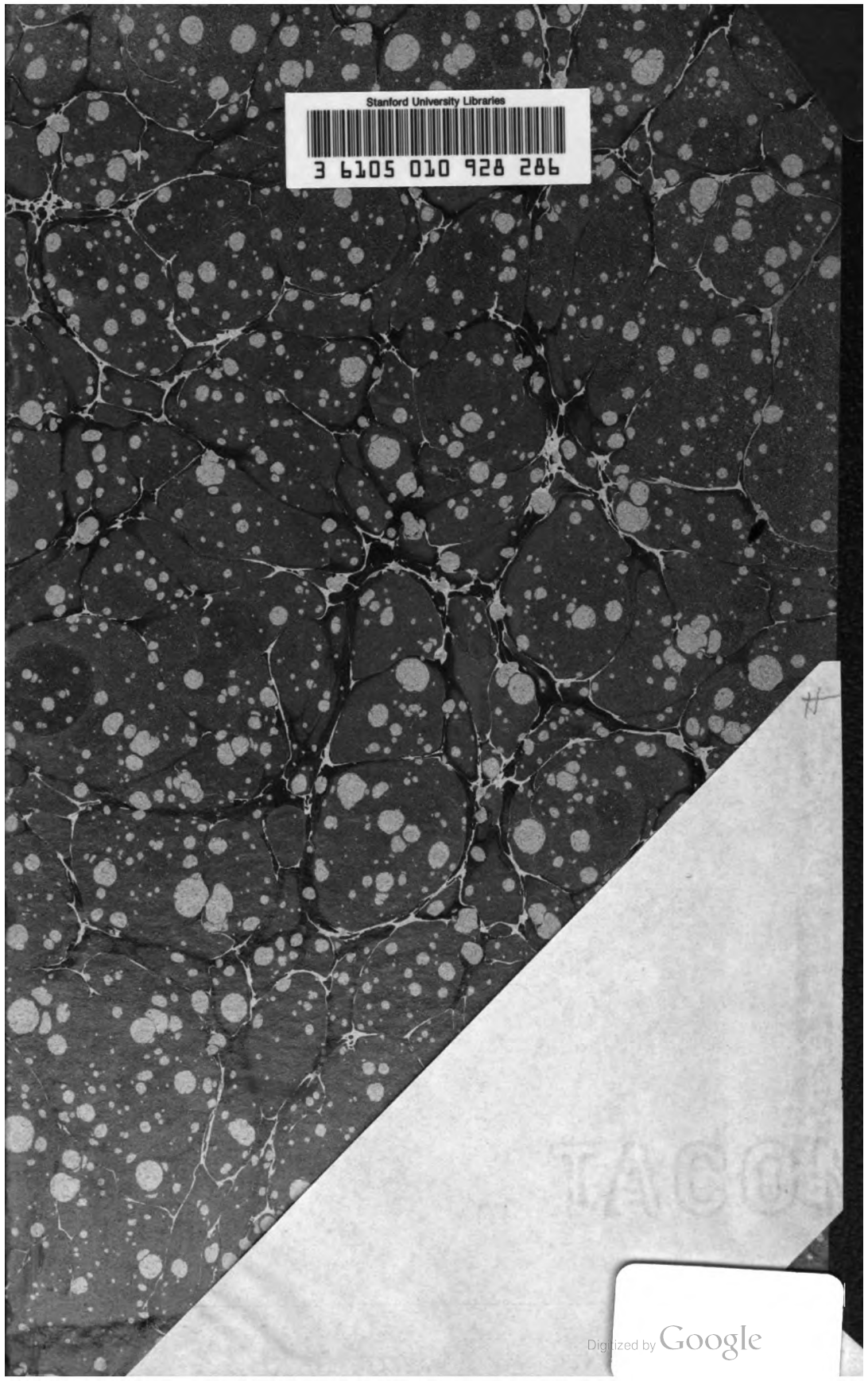
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